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Feasibility of Integrating Contract Management Software in an NPS Curriculum

September 2024

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Prepared for the Naval Postgraduate School, Monterey, CA 93943.

ACQUISITION RESEARCH PROGRAM
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ABSTRACT

This capstone applied project explores the feasibility of integrating contract management software tools, specifically Unison's reverse auctioning and Noblis' source selection evaluation software, into the Naval Postgraduate School's Contract Management courses (MN3303 and MN3315). The study addresses the gap between theoretical knowledge and practical application in preparing future Navy contracting officers. Utilizing qualitative methods, including faculty interviews and surveys, the research evaluates how these tools can enhance educational outcomes by aligning classroom learning with real-world contract management processes. The findings indicate that integrating these software tools could significantly improve students' readiness by providing hands-on experience with critical contracting tasks. Based on these insights, the study recommends a strategic enhancement of the curriculum to include these tools, ultimately aiming to better prepare officers for the complexities of defense contract management.

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—Rod

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—Joel

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—James

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LIST OF ACRONYMS AND ABBREVIATIONS

CFCM	Certified Federal Contract Manager
CMBOK	Contract Management Body of Knowledge
CMS	Contract Management Standard
CPCM	Certified Professional Contract Manager
CRS	Congressional Research Service
DAWIA	Defense Acquisition Workforce Improvement Act
DDM	Department of Defense Management
DFAR	Defense Federal Acquisition Regulation
DoD	Department of Defense
DOI	Diffusion of Innovation Theory
ELT	Experiential Learning Theory
FAR	Federal Acquisition Regulation
FedRAMP	Federal Risk and Authorization Management Program
GAO	Government Accountability Office
GIA	Government-Industry-Academia
ICT	Information Communication and Technology
IG	Inspector General
JPME	Joint Professional Military Education
MN	Course designator for Naval Postgraduate School courses
NAVPLAN	Chief of Naval Operation Navigation Plan
NCMA	National Contract Management Association
NDIS	National Defense Industrial Strategy
NDS	National Defense Strategy
NDSTS	National Defense Science and Technology Strategy
NPS	Naval Postgraduate School
PALT	Procurement Administrative Lead Time
PRISM	Program Management Information System
SaaS	Software as a Service
SOW	Statement of Work
USINDOPACOM	U.S. Indo-Pacific Command

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I. INTRODUCTION

The purpose of this chapter is to introduce our research on the feasibility of integrating contract management software into the Naval Postgraduate School (NPS) curricula. This chapter will begin by providing a background of our research topic, highlighting the importance of advanced software tools in enhancing educational outcomes for U.S. Navy contracting officers. We will then present the problem statement and purpose statement, outlining the research's focus on bridging the gap between theoretical knowledge and practical application in the NPS contracting courses. Following this, we will discuss the research questions guiding our study, as well as the benefits and limitations associated with the integration of these technologies. The chapter will conclude with an overview of the research methodology employed and a brief outline of the structure of the entire report.

A. BACKGROUND

Educational institutions play a crucial role in shaping student's life beyond formal education. One of the ways to fulfill this responsibility is for educators to foster "technological literacy" in students (Garmire & Pearson, 2006, p. 32). Technological Literacy is the knowledge and understanding of technology that empowers individuals to navigate and succeed in an organization where technology is widespread and continuously advancing (Garmire & Pearson, 2006). Given the rapid technological advancements and increasingly complex contract management requirements, it is essential that U.S. Navy contracting officers are adequately trained and prepared for the advanced roles in acquisition and contract management. This necessity is reinforced by the Federal Acquisition Regulation (FAR), which emphasizes the critical role of contracting officers in leading business process innovations and ensuring sound business decisions. Contracting officers must be empowered and prepared to perform their functions and duties effectively (FAR 1.102-5, 2024). This empowerment includes a strong focus on training and professional development to maintain and enhance their knowledge and skills.

The 2022 *National Defense Strategy* (NDS) highlights the need to build a diverse and talented workforce to address national security challenges in today's complicated world. It also emphasizes the need for modernizing defense systems and strengthening partnerships with educational institutions to ensure the workforce is prepared for future demands (Austin, 2022). Despite these needs, many educational institutions, including military training programs, struggle with the weak utilization of technology and insufficient preparation of individuals for the demands of the modern digital economy (Ariga et al., 2021). Institutions that fail to leverage technological and pedagogical innovations are not effectively equipping students with the necessary skills and knowledge, impacting their readiness for immediate effectiveness in their roles (Halabieh et al., 2022; Bell & Reigeluth, 2014).

The integration of advanced software tools, such as ProPricer, into the educational environment, has been identified as a potential solution to this problem (Cooper, 2022). Research indicates that exposure to and practice with these technologies during training can significantly enhance the readiness and performance of military personnel in acquisition roles (Cooper, 2022). Moreover, the adoption of innovative technologies in educational settings has been shown to facilitate experiential learning and improve the overall learning experience, aligning with the broader goals of modern educational paradigms (Ghavifekr & Rosdy, 2015). Effective Information, Communication, and Technology (ICT) integration in education has demonstrated improvements in teaching efficacy and student engagement (Ghavifekr & Rosdy, 2015; Jaiswal, 2020), which are critical for preparing military officers for the complexities of their roles. As highlighted by Halabieh et al. (2022), schools that adopt new technologies and teaching methods are best suited to prepare students for the technology era. These kinds of schools tend to focus on building supportive relationships, encouraging deep learning, and offering hands-on experiences (Halabieh et al., 2022).

Incorporating advanced technological tools into the curriculum, as advocated by studies above, not only addresses the current training deficiencies but also affords Naval contracting officers to navigate and manage the complexities of contemporary military contract management environments. This approach aligns with the findings of the

Diffusion of Innovation Theory, which emphasizes the importance of relative advantage, compatibility, and observability in the successful adoption of new technologies (Rogers, 2003). By embedding these tools into military education, we can ensure that future officers are not only familiar with the latest technologies in the fleet but also adept at leveraging them to enhance contract management efficiency and effectiveness. The integration of educational technologies into higher education, which has been widely recognized as beneficial for student engagement, significantly enhances academic performance. As noted by Jaiswal (2020), this enhancement provides a compelling foundation for the benefits of such integration in specialized fields like Defense Contract Management.

Adopting a co-education model that brings together government, industry, and academia (G-I-A) can be instrumental in narrowing the divide between theoretical concepts and their practical application (Poree, 2024). Kelley Poree's research underscores that G-I-A co-education minimizes ecosystem variations, enhances trust, collaboration, and innovation early in the buyer/seller professional development cycle. Such an optimized system benefits all stakeholders—stockholders, suppliers, employees, and customers—by fostering an environment of mutual trust and innovative problem-solving (Poree, 2024; Deming, 2018). This method aligns with FAR part 1, which stresses the importance of consistency when it boosts efficiency or guarantees fairness while still permitting flexibility and innovation where uniformity is not crucial (FAR 1.102-2(b)(2), 2024).

MN3303 (Principles of Acquisition and Contract Management), which presents the fundamental principles of acquisition and contract management, and MN3315 (Acquisition Management and Contract Administration), which builds on these principles, are pivotal courses in the NPS 815/835 curriculum designed to prepare future U.S. Navy contracting officers for their roles in fleet contract management (NPS, n.d.a, n.d.b). However, as contract management processes become more intertwined with technological advancements, there is a growing gap between the theoretical knowledge imparted through the current versions of these courses and the practical skills required in the field. This gap poses significant challenges in seamless transitions from educational environments to real-world applications, leading to delays and inefficiencies in contract management operations.

Recognizing this gap, Poree (2024) emphasizes that a comprehensive strategy is required to integrate contract management instructional software tools into the curriculum of these courses. This integration is crucial for aligning theoretical knowledge with practical application, as well as with modern contract management technologies and practices. According to Poree (2024), such integration is essential for enhancing the readiness and effectiveness of future U.S. Navy contracting officers. Furthermore, Poree (2024) asserts that it ensures the Navy's contract management processes are agile, responsive, and capable of meeting the challenges posed by an ever-evolving technological landscape.

The 2024 GAO report highlights several key challenges and areas for improvement in DoD contract management, including the need for validated requirements, accurate budget forecasts, and efficient use of category management. These areas are critical for making informed, cost-effective decisions and mitigating risks (Dodaro, 2023). Additionally, the GAO report underscores the importance of the development of guidance and training to address capability gaps (Dodaro, 2023). Integrating these advanced practices and principles into the NPS curriculum would directly address the deficiencies identified by the GAO report, thus preparing Naval contracting officers to effectively manage and oversee complex contract management operations in a dynamic environment.

The 2022 *National Defense Strategy* highlights the need for U.S. government agencies to collaborate to improve technology, make information sharing easier, expand access, and update controls to better share information for everyone's benefit (Austin, 2022).

Two software technologies that are important and currently in use within the Navy's contracting mission are Unison and Noblis. Unison and Noblis are critical to the Navy's contracting mission, leveraging their extensive user bases and offering substantial benefits to enhance contract management processes. Unison's contract management solutions are utilized by over 200,000 users across all 15 cabinet-level agencies and 26 major DoD programs, making them integral to federal management operations (Unison, 2023). Unison's program management information system (PRISM) software is a powerful and intuitive contract writing system that is fully compliant with federal regulations,

ensuring standardized and legally sound contract management processes. This compliance aligns with FAR 1.602, which require contracting officers to ensure that contracts adhere to federal regulations, emphasizing the importance of legal and standardized contract management processes (FAR 1.602, 2024). Furthermore, the software supports the requirements outlined in FAR 4.801, which specify the need for standardized documentation and the use of consistent contract data elements, ensuring a compliant and reliable contract writing system (FAR 4.801, 2024). By automating routine tasks and reducing duplicate data entry, Unison's solutions lower operational costs and minimize risks associated with manual processes. The cloud-based Software as a Service (SaaS) model further enhances system security through Federal Risk and Authorization Management Program (FedRAMP) compliance and reduces maintenance costs.

Unison provides real-time visibility and transparency across the enterprise, crucial for informed decision-making, aligning with the FAR performance standard, which emphasizes the need for transparency in acquisition processes to promote integrity and public trust (FAR 1.102, 2024). Its advanced reporting and analytics capabilities, supported by the Insight Platform, enable the tracking of contract management milestones and performance, leading to more strategic and data-driven decisions as outlined in FAR contract reporting, which mandates maintaining an acquisition reporting system for data accuracy, integrity, and timeliness (FAR 4.6, 2024). Additionally, Unison promotes structured collaboration between program offices and vendors, eliminating bottlenecks and reducing Procurement Administrative Lead Time (PALT), resulting in more efficient procurement cycles and timely project completions in accordance with FAR general procedures, which encourage early collaboration to streamline the acquisition process (FAR 7.104, 2024). The platform's adaptability and scalability ensure it meets the Navy's evolving contract management requirements and technological advancements.

Similarly, the Noblis Acquisitions platform has proven its effectiveness and widespread adoption by helping hundreds of government programs successfully procure more than $460 billion worth of goods and services. For the Navy, which manages complex and large-scale contract management projects, the platform's robust tools lead to substantial improvements in efficiency and compliance to meet the mission's performance

standards, aligning with FAR performance standards (FAR 1.102-2, 2024). Noblis streamlines acquisition processes, reducing contract life cycle times and ensuring compliance with federal regulations, as outlined in FAR general procedures (FAR 7.104, 2024). By automating key functions and offering a secure, collaborative environment, Noblis allows contracting officers to focus on source selection evaluation criteria, improving decision-making and enhancing the overall contract management process, in line with FAR 4.603, which mandates the use of acquisition systems to support federal procurement efforts (FAR 4.603, 2024).

Noblis also offers tailored interfaces for secure vendor submissions, scalable solutions for managing large government-wide contracts, and role-based permissions that enhance team collaboration, in accordance with FAR 4.502, which emphasizes secure access to acquisition systems (FAR 4.502, 2024). This flexibility and security are essential for the Navy's operations, which often involve handling sensitive information and coordinating with multiple stakeholders, as supported by FAR 1.602-2, which outlines the responsibilities of contracting officers to protect the government's interests in procurement (FAR 1.602-2, 2024). The statistics and benefits demonstrate Noblis's potential to enhance contract management efficiency, reduce costs, and improve outcomes, making it a valuable asset for the Navy's contract management strategy.

Further supporting this effort, the 2023 *National Defense Industrial Strategy* (NDIS) highlights the critical need to fortify the defense industrial base and improve logistical systems against subversion, compromise, and theft, emphasizing the integration of innovative technologies across government and partner operations (Hicks, 2023). The NDIS also emphasizes the critical role of technological innovation and advancement in maintaining and extending military capabilities. The strategy stresses the importance of an integrated approach that includes developing and fielding capabilities rapidly and on a large scale to respond to evolving threats and maintain a competitive edge, leveraging asymmetric U.S. advantages such as entrepreneurial spirit and a diverse system of ideas and technology generation (Shyu, 2023).

Incorporating these strategies into the contract management curriculum will prepare officers for current contract management practices and future advancements,

ensuring their effectiveness in roles of increasing responsibilities upon graduation. To this end, this research aims to develop a strategic approach for the incorporation of the latest acquisition software and technologies into the educational curriculum of future Naval contracting officers. By doing so, it seeks to bridge the gap between theoretical education and practical application, ensuring that Naval contracting officers are knowledgeable about modern contract management practices and adept at leveraging technology for enhanced operational efficiency.

B. PROBLEM STATEMENT

Ensuring U.S. Navy contracting officers are thoroughly prepared for advanced roles in acquisition and contract management becomes more critical as organizations navigate an era marked by technological advancements and increasingly intricate contract management requirements. Traditional educational models, requiring mastery of course material through testing and writing, may not fully equip these officers with the essential skills and knowledge required for immediate effectiveness in their contract management roles upon graduation. A promising solution lies in incorporating the latest software and technologies, currently in use across mission areas, into the educational curriculum (Bearden et al., 2024). By introducing future U.S. Navy contracting officers to the tools and technologies actively employed in fleet contract management early in their career development, we can seamlessly connect theoretical knowledge with practical application. This approach is supported by Kelley Poree's conclusion that Government-Industry-Academia Co-Education minimizes ecosystem variations, enhances trust, collaboration, and innovation early in the buyer/seller professional development cycle, and benefits all stakeholders, including stockholders, suppliers, employees, and customers.

C. PURPOSE STATEMENT

The purpose of this qualitative study is to explore the perceptions and feasibility of integrating contract management software tools, specifically Unison' reverse auctioning and Noblis' source selection evaluation software, into the NPS's 815-contracting management curriculum, with a focus on courses MN3303 (Principles of Acquisition and Contract Management) and MN3315 (Acquisition Management and Contract

Administration) (NPS n.d.a). The study aims to assess how the incorporation of these innovative contract management technologies can enhance the preparedness of future U.S. Navy contracting officers by seamlessly connecting theoretical knowledge with practical application. Through an analysis of the current state of Contract Management education at NPS, the role of technology in addressing the limitations of current educational strategies, and the specific functionalities and advantages of the proposed software tools, this research seeks to develop a comprehensive strategy for modernizing the 815/835 curriculum and improving the readiness of officers for advanced roles in acquisition and contract management. The study will use interviews with NPS Department of Defense Management (DDM) faculty members to gather insights into the challenges and successes of implementing cutting-edge contract management technologies in government settings. Ultimately, the findings aim to contribute to the development of a revised curriculum that aligns with modern contract management practices and equips future U.S. Navy contracting officers with the essential skills and knowledge needed for immediate effectiveness upon graduation.

D. RESEARCH QUESTIONS

The research questions formulated in this study are crucial for achieving the primary goal of our research: evaluating the feasibility of integrating contract management tools into the NPS curriculum. By systematically addressing these questions, we aim to generate valuable insights that will inform our recommendations for bridging the gap between theoretical instruction and practical application in contract management education. Successfully answering these questions will not only guide the development of more effective training programs for future U.S. Navy contracting officers but also enhance their readiness and capability to perform efficiently in real-world contract management operational settings. The following research questions guide our inquiry into these objectives:

- **Primary Research Question:** How can the integration of instructional software tools into the MN3303 (Principles of Acquisition and Contract Management) and MN3315 (Acquisition Management and Contract

Administration) courses offered by the NPS' Department of Defense Management enhance the preparedness of future U.S. Navy contracting officers in the fleet?

- **Secondary Research Question:** What are the essential elements of a revised course for the MN3303 (Principles of Acquisition and Contract Management) and MN3315 (Acquisition Management and Contract Administration) that would effectively integrate the Contract Management Software Tools that seamlessly connect theoretical knowledge with practical application.

E. BENEFITS

Integrating contract management software tools, such as Unison's reverse auctioning and Noblis' source selection evaluation software, into the MN3303 (Principles of Acquisition and Contract Management) and MN3315 (Acquisition Management and Contract Administration) courses at the NPS offers significant benefits. By familiarizing students with the software tools they will encounter in the fleet, this integration ensures that graduates are not only knowledgeable but also proficient in their use. This hands-on experience allows them to be immediately effective upon returning to the fleet, reducing the time needed to develop full competency as contracting management officers. Consequently, they will be better prepared to contribute effectively to the U.S. Navy's contract management mission, resulting in more timely and streamlined contract management processes. Teaching these tools in a classroom setting that mirrors real-world applications helps bridge the gap between academic knowledge and practical skills, ultimately enhancing operational readiness and efficiency within the Navy's contract management operations. This approach ensures that future U.S. Navy contracting officers are well-equipped to manage the complexities of defense contract management, thereby supporting the U.S. Navy's strategic objectives more effectively and efficiently.

F. LIMITATIONS

The scope of the research project is specifically focused on the integration of Noblis' source selection evaluation software alongside Unison's reverse auction software, into the 815/835 contracting management curriculum, specific in two courses offered at the NPS: MN3303 (Principles of Acquisition and Contract Management) and MN3315 (Acquisition Management and Contract Administration). This study aims to gain insight into the feasibility of such an integration from faculty involved in this curriculum, with an emphasis on the potential enhancements these software solutions can bring to the contract management education training process.

G. RESEARCH METHODOLOGY

This qualitative study that employs triangulation is based on in-depth interviews and a survey with NPS contract management faculty members to explore the current state of its curriculum and more specifically the possible integration of contract management software tools into the MN3303 and MN3315 courses. Semi-structured interviews aimed to assess the potential impacts and feasibility of incorporating specific software tools, namely Unison's reverse auctioning and Noblis' source selection evaluation software, into the course curriculum. This approach builds on an understanding gained through a review of the literature by adding practical insights gained from firsthand accounts of educators and practitioners in the field. The research process was designed to ensure a robust analysis of how these technological tools could enhance the educational outcomes and operational readiness of future U.S. Navy contracting officers, aligning theoretical knowledge with practical application.

H. RESEARCH PROJECT OUTLINE

This report is comprised of five chapters. Chapter I provided a background of the research, including the problem statement, purpose statement, research questions, benefits, limitations, and the methodologies employed. Chapter II provides a detailed literature review exploring the role of technology in modernizing the curriculum for the MN3303 and MN3315 courses at NPS, with a focus on integrating reverse auctioning and source selection software into the classroom. It evaluates existing academic discourse and

identifies gaps pertinent to NPS's specialized needs. Chapter III describes the qualitative research methodology used in this study, including data collection through interviews with NPS faculty to gauge their perceptions of integrating specific software tools into the curriculum. It also details the process of engaging stakeholders to understand the practical implications of such integration. Chapter IV analyzes the feedback gathered from NPS faculty, discussing key themes and insights on the potential impacts of software tools on the educational experience and readiness of future U.S. Navy contracting officers. Based on this analysis, an actionable recommendation is presented. Finally, Chapter V consolidates the key findings of this research. It also offers recommendations for further research and curriculum enhancements to ensure the NPS defense contract management program stays aligned with advancing industry practices and technologies.

I. SUMMARY

This chapter provided an introduction to our research on incorporating contract management software into the NPS curriculum. We began by presenting the background of the research, which led to the development of our problem statement, highlighting the need to bridge the gap between theoretical knowledge and practical application in contract management education. This discussion naturally progressed to our purpose statement, outlining the objectives of the study, and the formulation of our research questions, designed to guide the inquiry into how software integration could enhance the preparedness of future U.S. Navy contracting officers. We also explored the potential benefits of this integration, such as improved operational readiness and efficiency, along with the limitations and challenges that may arise. Finally, we outlined the methodology employed in this research, including qualitative data collection through interviews and surveys with NPS faculty. The next chapter will present a comprehensive literature review that supports this research, drawing on relevant theories, frameworks, and prior studies to provide a solid foundation for our investigation.

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II. LITERATURE REVIEW

A. INTRODUCTION

In this chapter, we provide a comprehensive literature review to establish the foundation for our research on integrating contract management software tools into the curricula at the NPS. The review begins with a discussion of the theoretical frameworks, including Everett Rogers' Diffusion of Innovation Theory and Kolb's Experiential Learning Theory, which guide our understanding of technology adoption and experiential learning in educational settings. We then explore the current state of the NPS Contract Management Graduate Education, examining the existing programs and their alignment with professional standards. The review further delves into the NCMA Contract Management Body of Knowledge (CMBOK) and Contract Management Standard (CMS), highlighting the core competencies and processes essential for effective contract management. Additionally, we analyze the execution of contract management within mission areas, focusing on the practical application of these competencies in real-world scenarios. Finally, we review other related contract management research to contextualize our study within the broader academic and professional discourse. This chapter aims to provide a thorough understanding of the existing literature and frameworks, thereby supporting our exploration of enhancing the NPS curriculum with advanced software tools.

The Naval Postgraduate School plays a crucial role in educating the Defense Acquisition workforce for advanced acquisition and contract management roles, ensuring they are well-prepared to meet the demands of national security. As the landscape of military contract management evolves, integrating advanced software tools into the curriculum becomes increasingly critical. Teaching and learning that incorporates technology prove to be more effective than traditional classroom methods. The use of Information, Communication, Technology and equipment creates a more dynamic and interactive learning environment, benefiting both teachers and students (Ghavifekr and Rosdy, 2015). The 2023 *National Defense Science and Technology Strategy* emphasizes the necessity of modernizing our capabilities, stating, "We cannot create 21st-century capabilities using 20th-century equipment, education, and employment policies" (Shyu,

2023, p. 9). Additionally, the 2022 Chief of Naval Operations Navigation Plan (NAVPLAN) advocates for continuous improvement and rigorous self-assessment to enhance warfighting capabilities (Gilday, 2022).

This literature review explores the integration of such contract management tools in courses such as MN3303 (Principles of Acquisition and Contract Management) and MN3315 (Acquisition Management and Contract Administration). The purpose of this review is to analyze how these technological advancements can enhance the educational outcomes of future U.S. Navy contracting officers, aligning theoretical knowledge with practical application. By integrating advanced software tools into the curriculum, NPS aims to provide students with hands-on experiences that mirror real-world scenarios, thereby improving their operational readiness and competency in high-stakes environments.

This literature review begins with the theoretical frameworks underpinning this integration, specifically on Everett Rogers' Diffusion of Innovation Theory and Kolb's Experiential Learning Theory. Furthermore, it will provide an overview of the current NPS contract management graduate education requirement, examining how the 815 and 835 curricula align with the competencies outlined in the NCMA CMBOK. This comprehensive review will thoroughly analyze the potential benefits and challenges of incorporating advanced software tools into the NPS curriculum, establishing a foundation for future research and practical implementation.

B. THEORETICAL FRAMEWORK

1. Diffusion of Innovation Theory

Everett Rogers' Diffusion of Innovation (DOI) theory provides a robust framework for understanding how new ideas, technologies, and practices spread within an organization or society. This theory identifies five key stages in the adoption process: knowledge, persuasion, decision, implementation, and confirmation (Rogers, 2003). In the context of integrating advanced software tools like Unison's reverse auctioning and Noblis' source selection evaluation software into the NPS's MS in Defense Contract Management curriculum, the following aspects are particularly relevant:

- **Knowledge:** Creating awareness of the new software tools among faculty and students is essential. This involves understanding the features, benefits, and potential impact of these tools on contract management education. According to Sahin (2006), the knowledge stage in Rogers' model is critical as it lays the foundation for subsequent stages by disseminating essential information that initiates the diffusion process.
- **Persuasion:** Stakeholders, including faculty, students, and administration, must be convinced of the advantages of adopting these tools. Persuasion involves demonstrating the alignment of these tools with current contract management practices and their potential to enhance educational outcomes. Ely (1999) emphasizes the importance of addressing the practical concerns and benefits to effectively persuade stakeholders during the adoption process.
- **Decision:** The institution must decide to adopt these tools based on evaluations and feasibility studies. This includes considering resource allocation, training requirements, and potential challenges. Dooley (1999) highlights that this stage often involves weighing the perceived benefits against the costs and risks associated with the new technology.
- **Implementation:** Actual integration of the software tools into the curriculum involves practical steps such as software installation, faculty training, and curriculum redesign. Ely (1999) discusses the importance of having adequate resources and support systems in place to facilitate the smooth implementation of new technologies in educational settings.
- **Confirmation:** The final stage involves assessing the effectiveness of the integrated tools and making necessary adjustments based on feedback and performance metrics. Sahin (2006) notes that this stage often requires ongoing evaluation and reinforcement to ensure the innovation is effectively assimilated into the educational environment.

Rogers' DOI theory predominantly focuses on the stages leading up to and including the adoption of an innovation, often overlooking the significant challenges that arise post-adoption, particularly in implementation and sustained use (Ely, 1999). One critical gap in Rogers' theory is its insufficient attention to resistance and non-adoption factors. MacVaugh and Schiavone (2010) emphasized that understanding non-adoption is as crucial as understanding adoption, highlighting technological, social, and learning conditions that can hinder the process. The DOI theory assumes a relatively uniform adoption process across different contexts, yet success varies widely depending on specific contextual factors such as resource availability and institutional support, which are crucial in the unique environment of NPS (Ely, 1999). Additionally, MacVaugh and Schiavone (2010) argue that overlapping effects of different contexts and domains are not sufficiently integrated into the DOI theory, complicating the adoption process through complex interactions between technological, social, and learning conditions. Practical implications of adopting new technologies extend beyond the theoretical stages, requiring specific conditions like adequate resources, knowledge, skills, and time for adaptation to ensure successful implementation and sustained use (Ely, 1999).

While Everett Rogers' Diffusion of Innovation (DOI) theory provides a valuable framework for understanding the spread of new technologies and ideas, it is essential to recognize its limitations and the complexities involved in the actual implementation and sustained use of innovations. By incorporating insights from Ely (1999) and MacVaugh and Schiavone (2010), a more nuanced understanding of these challenges can be developed, highlighting the importance of technological, social, and learning conditions that can hinder the adoption process.

By adopting a comprehensive approach that addresses the complexities of implementation, resistance, and contextual factors, and by linking theoretical frameworks to practical applications, a more robust strategy for the diffusion of innovations can be developed. This approach will not only enhance the educational outcomes at NPS but also contribute to a deeper understanding of the diffusion process in complex educational and military environments.

2. Kolb's Experiential Learning Theory

Kolb's Experiential Learning Theory (ELT) provides a valuable framework for understanding the process of learning through experience. This theory emphasizes the importance of reflection, conceptualization, and experimentation in the learning cycle, as illustrated in Figure 1.

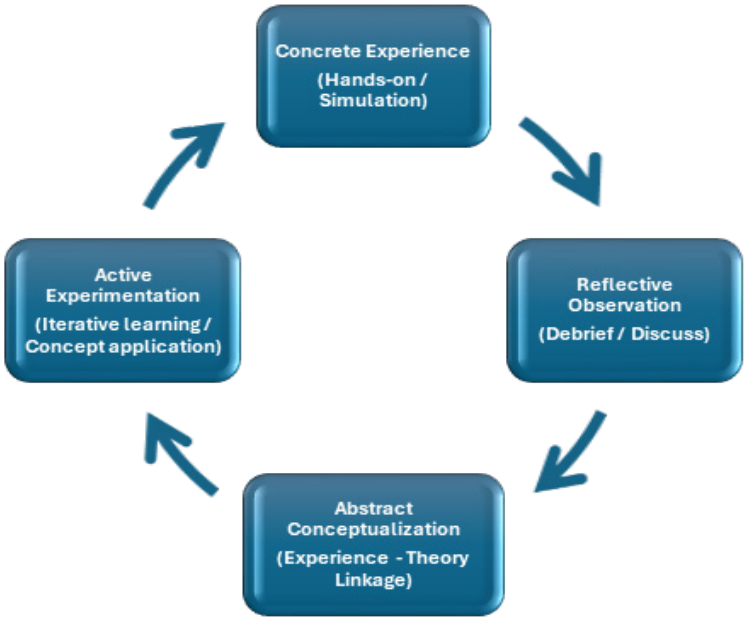

Figure 1. Kolb's Experiential Learning Theory. Adapted from Kolb (1984)

ELT outlines a four-stage cyclical model of learning comprising Concrete Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation (Kolb & Kolb, 2006). Applying this model to the integration of advanced software tools in contract management education involves the following:

- **Concrete Experience:** Students engage directly with the software tools through hands-on activities and simulations. For example, using Unison's reverse auctioning and Noblis' source selection evaluation software in practical exercises mimics real-world contract management scenarios. Concrete experiences provide the context for students to participate in activities and perform their roles, which is crucial for experiential learning

Fewster-Thuente & Batteson, 2018). This stage allows learners to gain firsthand experience, making the learning process more relatable and impactful (Fewster-Thuente & Batteson, 2018).

- **Reflective Observation:** After engaging with the software, students reflect on their experiences, discussing what worked, what didn't, and why. This reflection can be facilitated through class discussions, debrief sessions, and reflective writing assignments. According to Kolb & Kolb (2005), reflective observation involves looking back on the experience to understand the nuances and outcomes, which helps in forming a deeper understanding of the concepts. The process of reflection is crucial for recognizing learning gaps and strengthening knowledge through critical thinking. Fewster-Thuente and Batteson (2018) discovered that during debriefing sessions, students who engaged in reflective observation were able to analyze their experiences, understand the thought patterns behind their actions, and develop new approaches for future practice. This is consistent with Armstrong and Mahmud's (2008) research findings, which highlighted the importance of reflective observation in helping learners to consolidate their experiences and draw meaningful insights (Fewster-Thuente & Batteson, 2018; Armstrong & Mahmud, 2008).
- **Abstract Conceptualization:** Students integrate their reflections into abstract concepts, linking their experiences with theoretical knowledge. This stage involves understanding the principles underlying the software tools and how they fit into broader contract management theories. As Armstrong (2008) suggests, abstract conceptualization allows learners to develop theories and models that can explain their experiences and guide future actions. This theoretical integration is crucial for developing a comprehensive understanding of the subject matter.
- **Active Experimentation:** Students apply their newly formed concepts to new situations, experimenting with different strategies and approaches

within the software environment. This iterative process helps solidify their understanding and adaptability to various contract management challenges. According to Kolb (1984), active experimentation involves applying new ideas and testing them in practice, which is essential for learning adaptation and innovation. This stage encourages learners to take risks and learn from their successes and failures, fostering a growth mindset.

While Kolb's ELT has been influential in educational practices, it is not without its criticisms. One significant critique is that ELT oversimplifies the learning process by reducing it to a four-stage cycle that may not accurately capture the complexity and variability of real-world learning experiences (Holman et al., 1997). Critics argue that the theory's emphasis on a cyclical model assumes a uniformity in learning processes that does not account for individual differences and contextual factors (Hopkins, 1993). Additionally, the theory has been criticized for being overly individualistic and not adequately addressing the social and cultural dimensions of learning (Vince, 1998).

Furthermore, the theory's reliance on reflective observation as a critical stage can be problematic. Reflective observation assumes that learners can accurately and effectively reflect on their experiences, which may not always be the case. Kayes (2002) points out that this stage can lead to superficial reflections if learners are not adequately guided or if they lack the skills to critically analyze their experiences. This criticism is supported by Hickox (1990), who found that only 61.7% of studies supported ELT, with 22.2% not supporting it, indicating a significant portion of research that questions its efficacy.

Despite these critiques, it is essential to recognize that Kolb's ELT provides a foundational framework that has been widely adapted and applied across various educational contexts. The theory's emphasis on experiential learning aligns well with modern educational practices that prioritize active learning and student engagement. Kolb (1984) acknowledges the complexity of learning and suggests that the four stages should be seen as an idealized cycle rather than a rigid structure. This flexibility allows educators to adapt the model to different learning environments and individual needs.

Moreover, the criticism regarding reflective observation can be mitigated through effective instructional design. Fewster-Thuente and Batteson (2018) demonstrated that structured debriefing sessions and guided reflections could enhance the depth and quality of students' reflections. Their study showed that when properly facilitated, reflective observation helps learners identify and address gaps in their understanding, thereby reinforcing critical thinking and deeper learning.

Additionally, Kolb's theory has evolved to incorporate social and cultural dimensions of learning. Kolb (2005) introduced the concept of learning spaces, which emphasizes the interaction between learners and their environment, thus addressing the social context of learning. This adaptation demonstrates the theory's capacity to evolve and remain relevant in diverse educational settings.

While ELT may not capture all aspects of the learning process, it provides a robust framework that supports experiential learning's core principles. By focusing on the learner's experience and promoting active engagement, ELT continues to be a valuable tool for educators seeking to foster meaningful and impactful learning experiences.

The discussion of Everett Rogers' Diffusion of Innovation Theory and Kolb's Experiential Learning Theory provides a theoretical foundation for understanding how new technologies can be effectively integrated into educational settings to enhance learning outcomes. These theories are directly applicable to our research on enhancing the NPS contract management graduate education programs. By applying these frameworks, we aim to explore how contract management software tools can bridge the gap between theoretical knowledge and practical application, ultimately improving the preparedness of future U.S. Navy contracting officers. The next section will discuss the specific NPS contract management graduate education programs, examining how they currently align with these theoretical insights and identifying opportunities for incorporating advanced technological tools to enhance the educational experience and operational readiness of the students.

C. NPS CONTRACT MANAGEMENT GRADUATE EDUCATION

The following are the NPS 815 and 835 Curricula as published in the 2024 NPS catalog.

1. 815 Master of Science in Defense Contract Management Program Overview

The 815 MS Defense Contract Management curriculum at the NPS is an interdisciplinary program that combines elements of theory, accounting, economics, finance, behavioral science, and operations/systems analysis (NPS, n.d.a). According to NPS, this program also includes specialized courses in acquisition and contracting, providing a robust educational framework that equips officers and civilians with the skills required for various contracting management roles within the Department of Defense (DoD). Furthermore, NPS (n.d.a) highlights that the program features a concentration option in strategic purchasing, addressing the evolving needs of defense contract management.

a. Program Structure and Duration

The 815 curriculum is designed to be flexible, allowing students to complete it within 12 to 18 months (NPS, n.d.a). The program includes Joint Professional Military Education (JPME) courses or elective academic certificates as required. This flexibility accommodates the diverse backgrounds and schedules of military and civilian personnel (NPS, n.d.a).

b. Alignment with CMBOK and CMS

The 815 curriculum aligns with the Defense Acquisition Workforce Improvement Act (DAWIA) certification requirements in the Contract Management career field (NPS, n.d.a). It also adheres to the NCMA CMBOK and CMS. This alignment ensures that graduates are well-prepared for professional certification examinations such as the Certified Federal Contract Manager (CFCM) and the Certified Professional Contract Manager (CPCM).

c. Course Highlights

The NPS 815 Curriculum offers a structured course of study that provides students with a comprehensive understanding of defense contract management (NPS, n.d.a). The curriculum includes a range of courses, from foundational subjects to advanced topics,

ensuring that graduates are well-prepared for leadership roles in defense contract management. The course highlights are listed below (NPS, n.d.a).

- MN3010, Leading Innovative Organizations and People: Develops leadership skills and innovative management practices.
- MN3156, Financial and Managerial Accounting: Introduces financial and managerial accounting principles and their applications.
- MN3301, Acquisition of Defense Systems: Explores defense systems acquisition from development to disposal.
- MN3303, Principles of Acquisition and Contract Management: Covers fundamentals of government acquisition and contracting processes.
- MN3312, Government Contracts Law: Examines legal frameworks governing federal contract management processes.
- MN3315, Acquisition Management and Contract Administration: Focuses on managing the award and administration of contracts.
- MN3320, Contract Cost and Price Analysis: Studies cost and price analysis methods in federal contracts.
- MN3321, Federal Contract Negotiations: Teaches techniques for government contract negotiations.
- MN4014, Competitive Strategy and Innovation: Develops strategic planning and innovation skills in competitive environments.
- MN4044, Defense-Focused Managerial Inquiry and Innovation Lab: Teaches critical thinking and analytical research methods.
- MN4053, Defense Budget and Financial Management Policy: Covers defense budgeting and financial management principles.
- MN4090, Capstone Applied Project: Integrates knowledge through a hands-on research project.

- MN4307, Defense Acquisition Program Management Case Studies: Analyzes case studies in defense acquisition program management.
- MN4311, Contracting for Services: Studies DoD policies and practices in services contracting.
- MN4371, Acquisition and Contracting Policy: Analyzes acquisition and contracting policies through case studies.
- MN4602, Acquisition Test and Evaluation Decision Science: Teaches decision science for acquisition testing and evaluation (NPS, n.d.a).

In addition to the required core courses, the 815 Curriculum at the NPS offers elective courses that provide specialized knowledge in key areas of defense acquisition and contract management (NPS, n.d.a). These electives, such as MN4304 Defense Systems Contracting, MN4314 Space Systems Acquisition and Contract Management, and MN4313 Innovative Contract Design, allow students to delve deeper into specific topics like major systems contracting, space systems acquisition, and innovative contracting methods for emerging technologies. These courses enhance the program's comprehensive approach, equipping students with advanced skills to navigate the complexities of defense contract management in specialized domains.

d. Competency Development

Graduates of the 815 curriculum are expected to develop competencies in various areas, including the followings (NPS, n.d.a):

- **Strategic Planning:** Formulating and executing acquisition strategies.
- **Cost Analysis:** Conducting thorough cost and price analyses to ensure fair and reasonable pricing.
- **Contract Negotiation:** Effectively negotiating contract terms and conditions.
- **Contract Administration:** Managing the entire life cycle of contracts, from award to closeout.

- **Ethical Considerations:** Upholding ethical standards in all contracting activities (NPS, n.d.a).

Career Outcomes: Graduates can pursue roles such as Contract Specialists, Contracting Officers, Directors of Contracts, and Contracts and Business Policy Staff Officers. The curriculum supports career advancement within the DoD and other federal agencies by providing the necessary skills and certifications.

2. 835 Master of Science in Contract Management Program Overview

The 835 Master of Science in Contract Management is a 24-month part-time distance learning program designed for "active duty military personnel, federal employees, international students, and defense contractor personnel" (NPS, n.d.b). It provides advanced education in acquisition and contracting within complex organizations, enhancing the professional capabilities of its students.

a. Program Structure and Delivery

This program is delivered online, allowing students to participate from various locations while maintaining their professional responsibilities. The synchronous online format facilitates live interaction between professors and students, ensuring a dynamic and engaging learning experience.

b. Alignment with Contract Management Body of Knowledge and Contract Management Standard

Like the 815 curriculum, the 835 program aligns with DAWIA certification requirements and NCMA Contract Management Body of Knowledge and Contract Management standards, preparing students for professional certification examinations such as the CFCM and CPCM (NPS, n.d.b). This alignment ensures that the curriculum meets the highest standards of the contract management profession.

c. Course Highlights

The following courses are key highlights of the 835 program, complementing the core curriculum covered in the 815 program. Other courses not listed below are similar to those in the 815 program (NPS, n.d.b).

- MN3172, Resourcing National Security: Policy and Process: Analyzes federal policy-making and resource decision-making for national defense .
- MN4105, Strategic Management: Teaches principles of strategic management in public and private sectors (NPS, n.d.b).

d. Competency Development

Graduates of the 835 program are expected to develop competencies in the below listed key areas (NPS, n.d.b):

- **Advanced Management Techniques:** Applying advanced management theories to real-world problems.
- **Strategic Acquisition Planning:** Developing and implementing effective acquisition strategies.
- **Financial Management:** Managing budgets and financial resources effectively.
- **Legal and Regulatory Compliance:** Navigating the complex legal landscape of government contracting.
- **Ethical Leadership:** Upholding ethical standards and practices in all contracting activities (NPS, n.d.b).

e. Career Outcomes

The 835 curriculum prepares graduates for senior management roles within the DoD and other federal agencies (NPS, n.d.b). Potential positions include Senior Contract Specialists, Acquisition Program Managers, and Policy Advisors. The program's emphasis

on advanced management and strategic planning equips graduates to lead complex acquisition projects and drive organizational success.

As previously stated, the NPS contract management curricula incorporate the NCMA CMBOK and CMS to ensure a comprehensive education in contract management. Building on this foundation, the next section will discuss the CMBOK and CMS.

D. CMBOK AND CMS

Both the 815 and 835 curricula at the NPS align with the competencies outlined in the NCMA CMBOK and CMS, reflecting a significant shift from the previous Department of Defense (DoD) competency framework. Following the 2020 National Defense Authorization Act (NDAA), Congress mandated the DoD to adopt industry standards accredited by a third party, leading to the formal adoption of the CMS in 2022. This marked a radical departure from the previous, less process-oriented framework, which often combined pre-award and award phases and focused primarily on the buyer's perspective.

The CMBOK, on the other hand, provides a comprehensive and process-oriented framework that covers the entire contract life cycle—from pre-award through award to post-award—detailing specific competencies in planning, solicitation, award, administration, and closeout. Notably, the CMBOK and CMS include both buyer and seller contract management activities, reflecting industry standards and acknowledging that a successful contracting officer must understand how buying actions affect the selling side. For example, the choice of a source selection strategy or contract type, such as a lowest price technically acceptable (LPTA) versus a trade-off approach, will yield different seller responses and requires a nuanced understanding of both perspectives.

Research by Albano (2013) was instrumental in highlighting these differences and advocating for a shift towards the CMBOK and CMS. Albano's thesis compared the then-current DoD competency framework with the CMBOK and CMS, concluding that the DoD should adopt these industry standards to address gaps in competencies and ensure alignment with broader contract management practices. His research was prescient, predicting the need for a standardized, detailed, and balanced approach long before Congressional action. The adoption of the CMBOK and CMS ensures that the DoD's

contracting personnel are now trained in a more holistic manner, preparing them to manage contracts effectively by understanding both the procedural aspects and the broader implications of their actions in the contracting environment.

1. The CMBOK Structure

a. The CMBOK is organized into two major components

- **Primary Competencies:** These are the essential skills and knowledge areas required for success in contract management, regardless of specific job roles. They form the foundation upon which all contract management activities are built.
- **Process Competencies:** These involve the integration and application of various job tasks to achieve specific milestones and desired behaviors within the contract management process. They are more role-specific and detail the practical implementation of primary competencies.

This dual structure ensures that the CMBOK is applicable to all contract managers, providing a clear roadmap for both broad and specialized contract management roles and applications.

The CMBOK Competency System, as illustrated in Figure 2, demonstrates the "interactive relationships between primary and subject matter competencies" (CMBOK, 2023, p. 24).

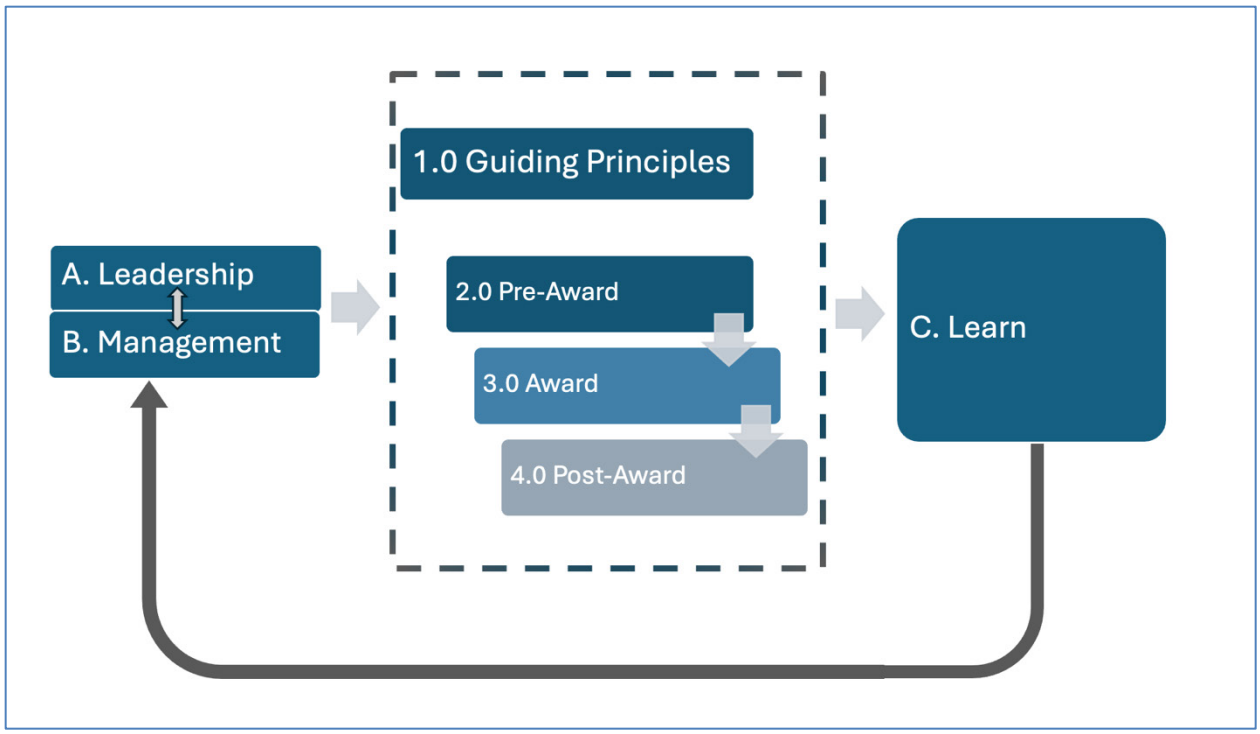

Figure 2. CMBOK Competency System. Adapted from CMBOK (2023).

- **Leadership Competencies (A):** These competencies are crucial for guiding teams and making strategic decisions that impact contract management.
- **Management Competencies (B):** These competencies focus on the effective administration and oversight of contract management activities.

The balanced and integrated implementation of these competencies enhances the technical skills required for successful contract management.

b. Guiding Principles (1.0)

The guiding principles of contract management apply to all phases of the contract life cycle, providing an environmental framework within which all contract managers, including buyers and sellers, operate (CMBOK, 2023). These principles ensure that contract managers:

- Uphold ethical standards and practices.

- Maintain compliance with relevant laws and regulations.
- Strive for efficiency and effectiveness in all contract management activities.

c. Contract Life Cycle Phases

Contract life cycle is divided into three main phases, each with specific competencies and tasks (CMBOK, 2023):

- **Pre-Award (2.0):** This phase involves planning, solicitation, and preparation of offers. Key activities include requirements determination, market research, and developing acquisition strategies. Understanding the pre-award phase is crucial for setting the stage for successful contract execution.
- **Award (3.0):** This phase includes the processes of cost and price analysis, negotiations, and source selection. Effective management of the award phase ensures that contracts are fair, reasonable, and in the best interest of all parties involved.
- **Post-Award (4.0):** This phase encompasses contract administration, performance monitoring, managing changes, and contract closeout. Post-award activities ensure that contract terms are met and that both parties fulfill their obligations, leading to successful contract completion.

d. Learn Competency (C)

The Learn competency is a cornerstone of both individual competence and organizational capability in contract management. This competency emphasizes the importance of continuous professional development for contract managers, ensuring they remain proficient and capable of managing complex contract scenarios effectively. At the individual level, the Learn competency involves actively expanding knowledge and skills through education, training, certification, and practical experience (CMBOK, 2023). However, it is not just about acquiring knowledge; it is about the effective application of

that knowledge, demonstrated through sustained individual competence and the ability to drive decisions and achieve meaningful results (CMBOK, 2023).

At the organizational level, the Learn competency extends beyond individual development to encompass the organization's overall process capability. This involves fostering an environment that supports continuous learning and process improvement, thereby enhancing the organization's contract management capabilities. Organizational capability is determined by the cumulative effect of all individuals' competencies and the integration of these competencies into coherent, effective contract management processes. As the CMBOK outlines, an organization's success in contract management is closely linked to its ability to maintain "competent people, capable processes, and effective internal controls" (CMBOK, 2023, p.271). Continuous learning and improvement at both the individual and organizational levels ensure that the organization remains adaptable and competitive, capable of meeting the evolving needs and objectives of its stakeholders. By aligning individual development with organizational goals, the "Learn" competency facilitates a culture of innovation and excellence, driving long-term success in contract management (CMBOK, 2023).

2. NPS Course Focus on Contract Life Cycle and CMBOK Competencies

a. Pre-Award Phase (2.0)

Courses such as MN3303 (Principles of Acquisition and Contract Management) and MN3301 (Acquisition of Defense Systems) play a critical role in the pre-award phase by addressing the following CMBOK competencies:

- **Plan Solicitation (2.1):** The course teaches students how to develop a comprehensive solicitation plan, including the identification of requirements, drafting solicitation documents, and planning the acquisition process.
- **Request Offers (2.2):** The course covers the methods for requesting offers from potential contractors, ensuring compliance with regulations and understanding market conditions.

- **Plan Sales (2.3):** Although often associated with seller activities, plan sales are categorized as an offer activity in this context. In MN3301, explore strategies for planning sales activities, particularly within the defense sector, focusing on the unique challenges and requirements of defense contract management.
- **Prepare Offer (2.4):** As an Offer activity, students learn how to prepare effective offers, including understanding the necessary documentation and ensuring offers meet all regulatory and contractual requirements.

b. Award Phase (3.0)

Courses like MN3320 (Contract Cost and Price Analysis) and MN3321 (Federal Contract Negotiations) are essential for the award phase, focusing on:

- **Price or Cost Analysis (3.1):** MN3320 delves into techniques for evaluating contract costs and prices, including cost analysis and price analysis methodologies. This competency ensures that contract prices are fair and reasonable.
- **Plan Negotiations (3.2):** MN3321 covers negotiation strategies and practices, teaching students how to plan and conduct negotiations to achieve favorable contract terms.
- **Select Source (3.3):** The course also includes criteria and processes for selecting the most suitable contractor, ensuring that the selection process is transparent, competitive, and compliant with regulations.
- **Manage Disagreements (3.4):** Students learn how to handle disagreements and disputes during the contract award process, using techniques for conflict resolution and ensuring contract integrity.

c. Post-Award Phase (4.0)

MN3315 (Acquisition Management and Contract Administration), MN4311 (Contracting for Services) and MN3384 (Acquisition Production, Quality, and Manufacturing Decision Science) focus on post-award competencies (NPS, 2024):

- **Administer Contract (4.1):** MN3315 course covers the administration of contracts, including monitoring contractor performance, managing contract changes, and ensuring compliance with contract terms.
- **Ensure Quality (4.2):** MN3384 course covers quality assurance processes, teaching students how to implement quality control measures and address any issues that arise during contract performance.
- **Manage Subcontracts (4.3):** MN4311 includes managing subcontracts, ensuring that subcontractors meet their contractual obligations and maintain the required performance standards.
- **Manage Changes (4.4):** Students learn how to handle contract modifications and changes, ensuring that all changes are properly documented and agreed upon by all parties.
- **Close Out Contract (4.5):** The course covers the process of closing out contracts.

Following our discussion on the CMBOK, which builds upon the CMS by offering a more detailed exploration of contract management contexts and influences, we will now turn to the CMS itself to examine its specific competencies.

3. CMS

The CMS provides a structured framework for understanding the key competencies required across the various phases of the contract management life cycle: Pre-Award, Award, and Post-Award. These competencies are essential for both buyers and sellers to effectively manage contracts from inception to completion. Figure 3 presents the CMS framework.

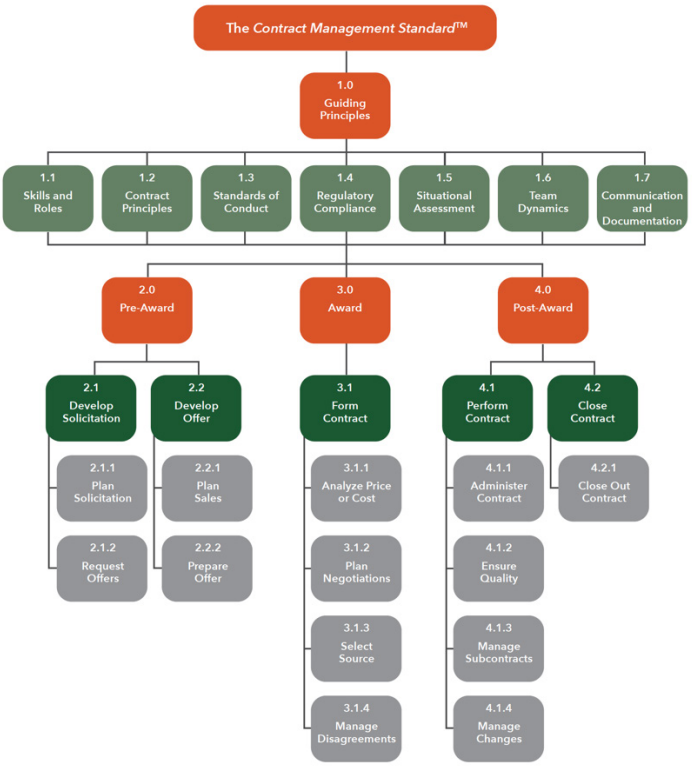

Figure 3. Contract Management Standard: Source CMS (2023).

a. Pre-Award Phase Competencies

During the Pre-Award phase, the focus is on developing both the solicitation and the offer, which are critical to setting the stage for successful contract execution (CMS, 2023).

- Develop Solicitation (2.1): This competency involves planning the solicitation process and requesting offers. Plan Solicitation (2.1.1) includes determining requirements, establishing solicitation strategies, and identifying potential sources. Request Offers (2.1.2) focuses on the actual process of inviting bids or proposals from potential suppliers or contractors.
- Develop Offer (2.2): This competency encompasses the activities necessary for preparing an effective offer. Plan Sales (2.2.1) involves strategizing on how to approach potential buyers, particularly in a

competitive defense contracting environment. Prepare Offer (2.2.2) entails crafting offers that are compliant with regulatory requirements and meet the needs outlined in the solicitation.

b. Award Phase Competencies

The Award phase centers around forming the contract based on the offers received and evaluated (CMS, 2023).

- Form Contract (3.1): Key competencies in this phase include Analyze Price or Cost (3.1.1), which involves evaluating the financial aspects of the offers to ensure value for money. Plan Negotiations (3.1.2) is about preparing for negotiations to achieve favorable terms and conditions. Select Source (3.1.3) entails evaluating offers and choosing the most suitable contractor or supplier. Lastly, Manage Disagreements (3.1.4) focuses on resolving any disputes that arise during the negotiation process to avoid potential conflicts.

c. Post-Award Phase Competencies

In the Post-Award phase, the emphasis shifts to contract performance and closeout, ensuring that all contractual obligations are fulfilled (CMS, 2023).

- Perform Contract (4.1): This competency area involves several critical tasks. Administer Contract (4.1.1) refers to overseeing the contract's execution to ensure compliance with terms and conditions. Ensure Quality (4.1.2) involves monitoring and ensuring that the deliverables meet the required standards. Manage Subcontracts (4.1.3) pertains to overseeing any subcontractors involved in fulfilling the contract. "Manage Changes (4.1.4) is about handling any modifications or amendments to the contract in a controlled manner.
- Close Contract (4.2): The final competency, Close Out Contract (4.2.1), involves completing all administrative tasks, ensuring all deliverables

have been met, and finalizing the contract documentation to formally close the contract.

The competencies outlined in the CMS under each phase of the contract management life cycle are essential for ensuring that contract managers are equipped with the necessary skills and knowledge to handle all aspects of contract management effectively. By adhering to these competencies, organizations can enhance their contract management processes, achieve better outcomes, and maintain successful buyer-seller relationships throughout the contract life cycle.

The previous section examined the CMBOK and CMS, highlighting their integration into the NPS Defense Contract Management curriculum to ensure that students are well-versed in industry standards and best practices. Building on this foundation, the purpose of this research extends to exploring how software technology can be effectively incorporated into specific courses within the NPS curriculum to enhance learning outcomes and operational readiness. The following section will focus on contract management mission area execution, discussing the potential for integrating advanced contract management software tools to streamline processes, improve decision-making, and provide hands-on experience to students preparing for real-world applications.

E. CONTRACT MANAGEMENT MISSION AREA EXECUTION

1. Contracting Courses with Software Integration

The integration of software tools such as ProPricer into contract management courses like MN3320: Contract Cost and Price Analysis and MN3321: Federal Contract Negotiations has demonstrated significant benefits (Cooper, 2022). These tools provide students, including prospective U.S. Navy contracting officers as well as contracting officers from the Marines, Army, Air Force, Coast Guard, and Space Force, with practical, hands-on experience in cost/price analysis and contract negotiations (FAR 15.404-1, 2024, FAR 15.405, 2024). This experience is critical in the contract award phase, where the focus is on selecting the best value offeror and establishing fair contract terms.

Using ProPricer, students learn to perform detailed cost and price analyses and conduct effective negotiations , skills that are essential in ensuring the government achieves

cost savings and reduces the risk of protests (FAR 15.404-1, 405, 2024). The implementation of these optimized systems benefits all stakeholders, including stockholders, suppliers, employees, and customers, by enhancing the overall efficiency and transparency of the contract management process.

Recent research (Poree, 2024) supports these findings, indicates that optimized systems benefit all stakeholders, including stockholders, suppliers, employees, and customers. By using these advanced software tools, future U.S. Navy contracting officers are better prepared to execute their responsibilities, ensuring a more effective and fair contracting process that adheres to the principles outlined in the FAR, ultimately leading to cost savings and reduced protests to the government.

Incorporating reverse auctioning and source selection software, like ProPricer, into contract management courses is paramount. Reverse auctioning streamlines the contract management process, driving down costs by fostering competitive bidding among suppliers. This competition ensures that the government receives the best value, adhering to the FAR policy for fair and reasonable pricing. Furthermore, sophisticated source selection tools enhance the evaluation process, reducing the likelihood of errors and subsequent protests. By integrating these technologies into the curriculum, students gain practical skills in leveraging digital tools for cost savings and efficient contract management. This not only prepares them for real-world scenarios but also supports the government's objectives of minimizing contract management costs and mitigating risks associated with contract disputes. The practical application of these tools ensures future U.S. Navy contracting officers are adept at utilizing technology to achieve optimal outcomes in federal contracting.

While research shows favorable outcomes in courses like MN3320 and MN3321, there is limited research on integrating software into courses such as MN3303 and MN3315. This study aims to address this gap and contribute to the body of knowledge.

2. Current Contracting Management Mission Area Challenges

Reverse auctioning aligns with the fundamental principles of contract management by enhancing efficiency and meeting customer expectations in terms of cost, quality, and

timeliness. This method accelerates the contract management process by enabling suppliers to bid in real-time, potentially lowering costs through increased competition. The FAR underscores the importance of minimizing administrative operating costs, and reverse auctioning serves this purpose by streamlining the bidding process, reducing paperwork, and expediting decision-making (FAR 1.102-2(b), 2024). This approach also fosters transparency and fairness, as all bidders have an equal opportunity to compete, adhering to the FAR's mandate for conducting business with integrity, fairness, and openness (FAR 1.102(b)(3), 2024).

Additionally, reverse auctions help fulfill public policy objectives by ensuring that contract management processes are responsive to customer needs and adaptable to their feedback, as specified by the performance standards linked to the guiding principles. According to FAR part 9 (2024), contractors with a history of successful performance or who exhibit exceptional capability should be given preference during the award process. Reverse auctioning can facilitate this by providing a platform where the best-suited contractors can competitively bid, showcasing their capability and past performance. This method not only satisfies the principles of cost, quality, and timeliness but also aligns with the broader goals of efficiency and responsiveness in government contract management, ultimately benefiting the end customer.

Effective source selection is crucial in government contract management to ensure that the government acquires high-quality goods and services at fair and reasonable prices while achieving best value. According to the Federal Acquisition Regulation (FAR), source selection processes must be conducted with integrity, fairness, and openness to maintain public trust and achieve the best outcomes for the government (FAR 1.102(b)(3), 2024). Proper source selection involves evaluating potential contractors based on their ability to meet the government's requirements, including past performance, technical capability, and cost considerations (FAR 15.305(a), 2024). By meticulously assessing these factors, the government can minimize risks and avoid potential pitfalls associated with poor contract management decisions.

Failure to conduct a thorough and fair source selection process can have severe consequences for the government. If an inadequate contractor is chosen, it may lead to

substandard performance, delays, and increased costs, ultimately failing to meet the needs of the end-users and stakeholders. The FAR emphasizes that selecting contractors with a demonstrated history of successful past performance is essential to mitigate these risks (FAR 9.104-1(c), 2024). Additionally, improper source selection can result in legal challenges, protests, and loss of public confidence, undermining the integrity of the contract management process. Therefore, adhering to the policy set forth in the FAR is vital to ensure that source selection is conducted effectively, safeguarding the government's interests and ensuring the successful execution of its missions.

The Government Accountability Office (GAO) has consistently highlighted significant challenges in contract management across the defense and government sectors, such as cost overruns, schedule delays, and performance shortfalls. Critical issues, including inadequate requirements definition, insufficient oversight mechanisms, a shortage of adequately trained personnel, and weaknesses in performance metrics, have been identified as key contributors to these pervasive problems (Dodaro, 2024). The Congressional Research Service (CRS) also emphasizes the necessity for robust acquisition planning, increased competition among contractors, and enhanced mechanisms to ensure contractor accountability, all of which are essential to addressing systemic inefficiencies (Keys and McGarry, 2023). Furthermore, reports from the Department of Defense Inspector General (DoD IG) have underscored the ongoing prevalence of fraud, waste, and abuse within defense contracting, citing specific issues such as improper payments, uncontrolled contract modifications, and compliance deficiencies (Storch, 2024).

In 2024, the GAO upheld 98 bid protests, largely due to significant problems with the NIH CIO-SP4 IT support contract—a major government acquisition initiative designed to provide comprehensive IT solutions and services to federal agencies. This increase in sustained protests underscores the persistent challenges in federal contract management and the urgent need for improvements to enhance efficiency and performance within government and defense acquisitions (Edwards, 2023).

The DoD IG has repeatedly identified acquisition and contract management as one of the top ten management challenges for the DoD, a recognition it has maintained for several years (Storch, 2024). Challenges in this area include difficulties negotiating sole-

source contracts, determining fair and reasonable prices, and conducting comprehensive price and cost analyses. These challenges are often exacerbated by insufficient training and oversight, issues that could be mitigated by integrating advanced software technologies into educational curricula. Such tools would provide students with practical, hands-on experience in real-world scenarios, thereby enhancing their skills in critical areas like negotiation and cost analysis (Storch, 2024).

Moreover, the Fiscal Year 2024 Top DoD Management and Performance Challenges report identifies several specific contract management issues that directly impact the readiness and operational effectiveness of U.S. military forces. These challenges include poor contract execution and oversight, which have affected the availability of pre-positioned stocks and contributed to personnel shortages, particularly in strategically important locations such as the U.S. Indo-Pacific Command (USINDOPACOM). For instance, the report highlights that personnel shortages in the USINDOPACOM region have caused significant delays and increased costs, demonstrating the need for improved strategic workforce planning and resource allocation (Storch, 2024).

Additionally, the report points to deficiencies in the accountability and maintenance of defense materiel, which have been aggravated by inadequate contract oversight and a lack of properly trained logistics personnel. These gaps have compromised the security and accountability of materiel transported to support operations in Ukraine, with deviations from established policies and procedures leading to heightened risks and operational delays (Storch, 2024). To address these deficiencies, a focused effort to improve contract oversight and accountability is necessary. Integrating advanced educational technologies into training programs could be crucial in equipping future contracting officers with the skills needed to navigate these complex challenges effectively.

By addressing these identified challenges and leveraging technology to enhance contract management education, the NPS curriculum can better prepare U.S. Navy contracting officers to meet the evolving demands of contract management. This sets the stage for further exploration of related research, which provides deeper insights into the challenges faced in contract management through case studies and empirical data.

3. Other Related Contract Management Research

Research from NPS delves deeply into the challenges faced in contract management, often using case studies and empirical data to support its findings. Stewart et al. (2020) highlights several key insights. Firstly, effective management throughout the contract life cycle, from pre-award to post-award, is crucial for success. Additionally, proactive risk management strategies are essential to mitigate potential issues before they escalate. Finally, leveraging innovative contracting methods, such as performance-based contracting, can significantly enhance outcomes (Poree, 2024).

Other related contract management research has focused on assessing contract manager competency and organizational contract management process maturity, as previously discussed in the CMBOK Learn Competency. For example, Rendon (2008) focuses on the development and use of the Contract Management Maturity Model (CMMM) as a "method for assessing, measuring, and improving an organization's" contracting life cycle processes (Rendon, 2008, p. 200). The findings from his case study highlight the advantages of employing a maturity model to evaluate performance and enhance processes within an organization (Rendon, 2008).

Continuing with the research stream on assessing contract management process capability, Rendon (2015) applied the CMMM to U.S. Navy acquisition organizations and finds that the Navy's contract management process maturity is "higher in the pre-award contracting phases, while lower maturity levels were reflected in the post-award contracting phases" (Rendon, 2015, p.1481). Rendon's research findings indicate that "higher maturity levels were reflected in the pre-award contracting processes" and "lower maturity levels were reflected in the post-award contracting processes" (Rendon, 2015, p. 1481). These maturity levels demonstrate the extent to which best practices have been implemented within Navy acquisition organizations, with "process capability enablers also reflect [ing] higher mean scores for the pre-award processes and lower mean scores for the post-award processes" (Rendon, 2015, p. 1481). Also related to the CMBOK Learn Competency, Rendon and Schwartz (2021), conducted an assessment of the Marine Corps Systems Command (MCSC) contracting workforce using a NCMA CMS-based assessment tool. Their findings indicate that this contracting workforce had higher

proficiency ratings (between Intermediate and Advanced) in performing the buyer tasks, compared to the lower knowledge ratings (between Basic and Intermediate) of the seller tasks (Rendon & Schwartz, 2021).

Finally, in the area of assessing the effectiveness of a Contract Management graduate degree program, Rendon (2011) explains how "the establishment of learning goals and objectives, alignment of curricula, and identification of assessment instruments and measures" can be utilized to assess the effectiveness of an education program and enhance student learning (p. 9).

After examining the research that underscores the critical role of effective contract management practices and the development of competencies, it is imperative to shift focus to the technological advancements driving these improvements. Current software solutions, such as Unison and Noblis, are pivotal in the mission area, offering sophisticated tools that enhance the efficiency and effectiveness of contract management processes across various defense services.

4. Current Software in the Mission Area.

Unison and Noblis: Unison and Noblis are two key software solutions used across various services for contract management. These tools provide comprehensive functionalities to support the entire contract management life cycle. Unison is widely used across the U.S. Navy, including NAVAIR, NAVSUP, and NAVSEA, as shown in Figure 4.

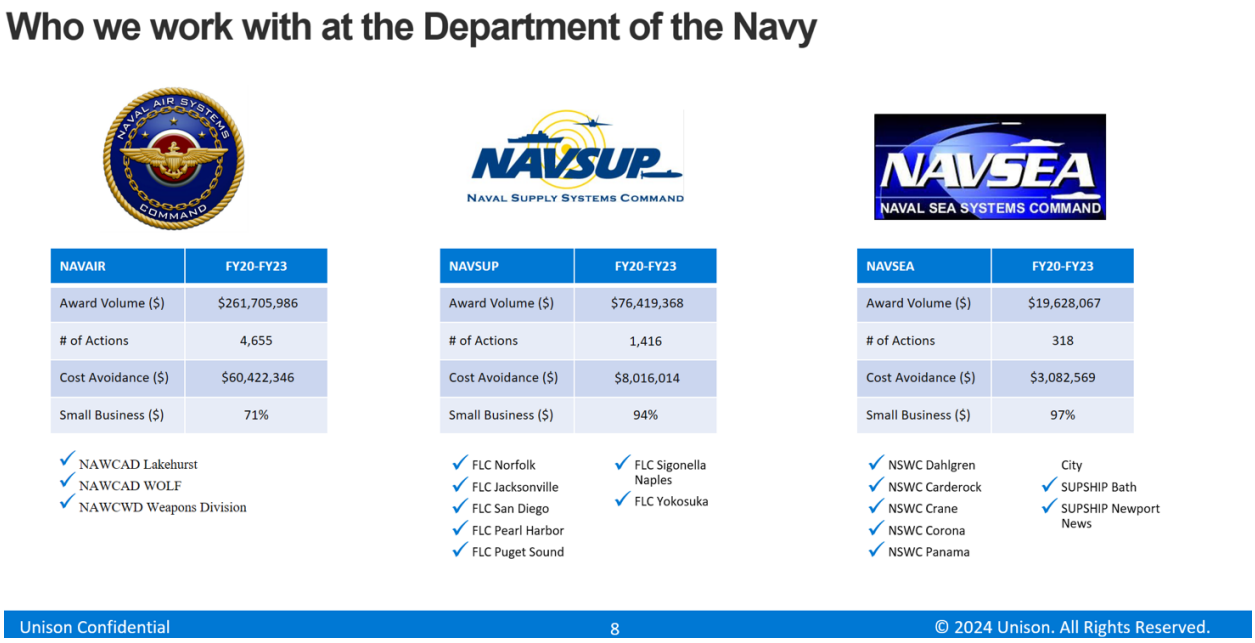

Figure 4. Unison U.S. Navy Customers. Source: Unison (PowerPoint slide to the authors, April 24, 2024)

a. Unison

Below are some key aspects of Unison's usage, functionalities, and benefits, as shown in Figure 4.

- **Usage:** Unison is predominantly engaged in research and development contracting, providing vital services to the three largest departments within the U.S. Navy's Supply Corps community: NAVAIR, NAVSEA, and NAVSUP. Over the past three years, Noblis has processed 6,389 actions, amounting to a total value of $357,753,422.00. A significant majority of U.S. Navy Supply Corps officers are assigned to one of these three commands upon graduating from NPS, highlighting the critical role these departments play in their professional development and career trajectory.
- **Functionalities:** Focuses on analytics, decision support, and process optimization.

- **Benefits:** Helps in managing complex contracts, provides robust analytical tools, and supports strategic decision-making.

b. Noblis

Noblis is an invaluable partner to the DoD, particularly through its extensive use in managing contract management and acquisition processes (Noblis, 2024), as shown in Figure 5.

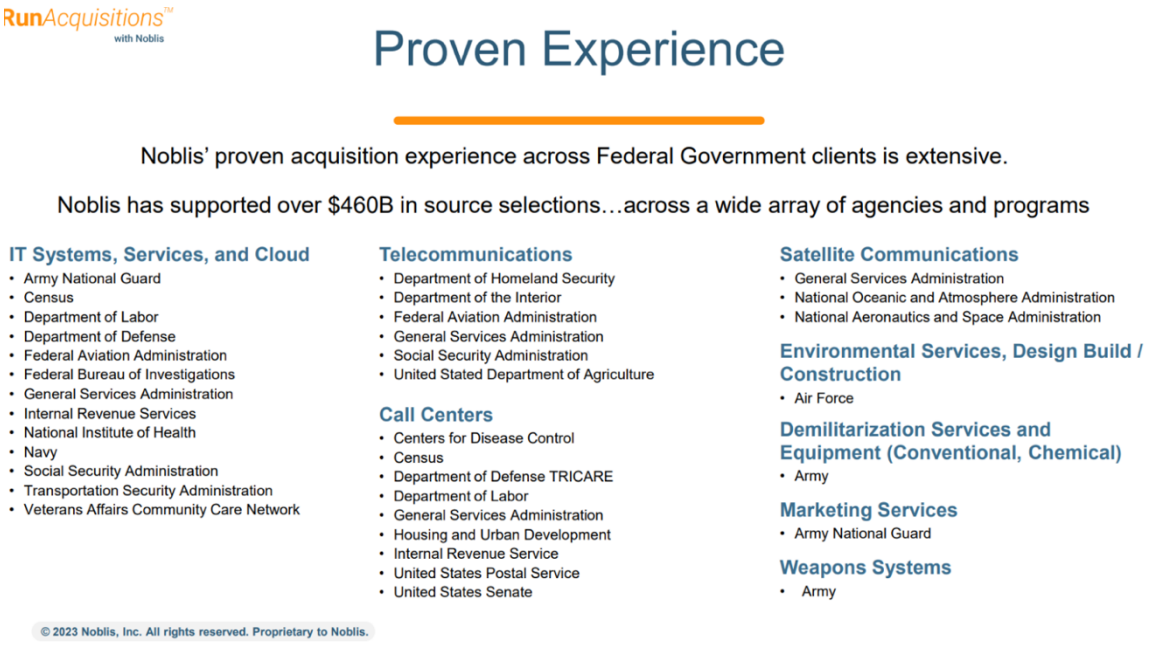

Figure 5. Noblis Clients. Source: Noblis (PowerPoint slide to the authors, May 21, 2024)

- **Department of Defense (DoD):** This partnership has resulted in significant efficiencies and enhanced capabilities across various defense operations. As evidenced by the substantial support provided in source selection, totaling over $460 billion across the federal government, Noblis' contributions to the U.S. Navy are particularly noteworthy. Noblis provides critical support to the U.S. Navy in the form of advanced IT systems, comprehensive services, and cutting-edge cloud solutions. These

> contributions have not only streamlined the Navy's contract management processes but also bolstered its operational effectiveness, cybersecurity posture, and overall mission readiness. The collaboration with Noblis ensures that the U.S. Navy remains at the forefront of technological advancements, ultimately enhancing its ability to safeguard national security and maintain maritime superiority.

As we explore the functionalities and benefits of software like Unison and Noblis in the Navy's contract management processes, it is also essential to consider the broader implications of integrating such technologies into educational settings. Understanding the feasibility and impact of incorporating these tools into curricula is critical for preparing future professionals to meet the demands of modern contract management.

c. Software Integration Feasibility and Impact

Incorporating technology into educational curricula for contract management is increasingly feasible and impactful, provided there is thorough planning, robust administrative support, and continuous assessment to ensure alignment with educational objectives (Andiola, Masters, & Norman, 2020). The integration of advanced software tools, including AI and automation, is particularly pertinent as the field of contract management evolves. Understanding the emotional and cognitive responses of students to new technologies is essential for fostering a successful adoption process in educational settings (Stein et al., 2015). This aligns with the 2019 white paper report published by the NCMA, which emphasized that the future of contracting will rely heavily on integrating technology into both education and practice. The NCMA report, which incorporated insights from senior leaders across various U.S. government agencies, including the Air Force, Army, Navy, Department of Defense, and other federal departments and agencies, noted that AI, data analytics, and other digital tools will become integral to contracting operations, thereby necessitating a technologically adept workforce (NCMA, 2019).

The potential impact of integrating contract management tools in education is substantial. It promises to enhance student engagement, develop advanced analytical skills, and better prepare students for the dynamic challenges in contemporary contract

management. However, the success of such integration depends largely on the quality of the implementation process. This process must include effective communication strategies to ensure that all stakeholders—including students, educators, and administrators—understand the benefits and operational aspects of the new tools (Tsai & Compeau, 2021). These strategies should clearly articulate the functionality, advantages, and relevance of the software tools to the students' future professional roles, thereby enhancing their practical understanding and preparedness for the evolving landscape of contract management.

To maintain the relevance and effectiveness of contract management education, several key components are essential. First, curriculum development must incorporate training on modern contract management tools and methodologies, with a strong emphasis on experiential learning. Providing hands-on training through simulations and real-world projects allows students to actively experiment and apply their knowledge in practical settings, fostering a deeper understanding of theoretical concepts (Kolb, 1984). Furthermore, continuous education and certification programs are vital for ensuring that professionals remain current with evolving industry standards, maintaining a balance between theoretical knowledge and practical application.

As highlighted in the NCMA report, the future of contracting will be characterized by a shift from traditional process-centered roles to more dynamic, solution-oriented approaches. This transformation will be driven by technological advancements, such as AI and automation, which will redefine the competencies and skills required for contracting professionals (NCMA, 2019). Therefore, integrating these technologies into educational and training programs is not just beneficial but necessary to prepare a competent and agile workforce capable of navigating future challenges in the field.

d. Summary

This literature review has examined the critical role of integrating advanced software tools into the NPS contract management curriculum. By leveraging Everett Rogers' Diffusion of Innovation Theory and Kolb's Experiential Learning Theory, the review highlights how these tools can enhance the educational experience for military

officers. The theoretical frameworks provide a robust foundation for understanding the adoption and practical application of software within the educational context. Moreover, the review delves into the current NPS 815 and 835 curricula, demonstrating how these programs align with the competencies outlined in the NCMA CMBOK and how they can be further enhanced through technological integration. This comprehensive analysis underscores the necessity of evolving the curriculum to meet the dynamic needs of modern contract management and defense contract management.

This literature review now sets the stage for a detailed exploration of how these advanced software tools will be integrated into the curriculum. The methodology will outline the data collection methods, and analytical approaches that will be employed to evaluate the effectiveness of these tools in enhancing educational outcomes. By bridging theoretical concepts with practical implementation, this research aims to provide a clear and systematic approach to assessing the feasibility and impact of technological advancements in contract management education. This seamless transition from literature review to methodology ensures a coherent and structured progression of the research, paving the way for meaningful insights and practical recommendations.

III. METHODOLOGY

The purpose of this chapter is to outline the methodology employed in our research on incorporating software technologies into the NPS Defense contract management curriculum. This chapter provides a detailed overview of the research methods and approaches used to address our primary research objectives. We begin by discussing the chosen research method and the rationale behind its selection, followed by a restatement of our research questions to clarify the focus of our study. We will then describe the data collection techniques utilized to gather relevant information and the analytical procedures applied to interpret the data.

A. RESEARCH METHOD

This study employs an Institutional Review Board (IRB)-approved qualitative research method to explore the perceptions and feasibility of integrating contract management software tools into the NPS 815 contract management curriculum. Specifically, the research focuses on integrating contract management software tools, Unison and Noblis. Qualitative research is effective for gaining insights from the participants' perspectives, making it particularly useful for evaluating how these software tools could be integrated into the NPS curriculum (Johnson & Christensen, 2012).

B. PURPOSE

This qualitative study aims to gather insights from NPS faculty members on the potential benefits, challenges, and impacts of incorporating Unison reverse auctioning and Noblis' source selection evaluation software into the courses MN3303 and MN3315. Miles et al. (2018) asserted that qualitative data offers a deep portrayal of social processes. By understanding these perspectives, the study aims to develop a strategic approach for modernizing the curriculum to enhance the readiness and effectiveness of future U.S. Navy contracting officers.

C. RESEARCH QUESTIONS

This research project addresses the following research questions:

- How can the integration of instructional software tools into the MN3303 and MN3315 courses at the NPS Defense Management Curriculum enhance the preparedness of future U.S. Navy contracting officers in the fleet?
- What are the essential elements of a revised curriculum for the MN3303 and MN3315 courses that would effectively integrate the contracting instructional software tools, seamlessly connecting theoretical knowledge with practical application?

D. DATA COLLECTION AND ANALYSIS

We collected data for this research through a comprehensive literature review, supplemented by interviews and surveys with subject matter experts and stakeholders. Following data collection, we employed a qualitative analysis and triangulation method to synthesize our findings

Literature Review: In our literature review, we first explored the theoretical frameworks that underpin our research, providing a foundation for understanding the integration of Information, Communication, and Technology (ICT) in contract management education. We then examined the current NPS curricula to assess how these theories are embedded within the educational practices at the Naval Postgraduate School. Following this, we discussed the NCMA CMBOK and CMS to understand their influence on contract management competencies and standards. We also analyzed contract management mission area execution to identify practical applications of these theories and frameworks. Finally, we reviewed other related contract management research to provide additional context and support for our study. These sources included academic articles from the Dudley Knox Library, government publications, and relevant peer-reviewed journals. This review informed the development of the interview questions and survey instruments.

Interviews: Semi-structured interviews were conducted with NPS faculty members to capture their perceptions on the feasibility and potential impacts of integrating the software tools. The interview protocol included questions on the current state of the curriculum, perceived benefits and challenges of the proposed software tools, and

recommendations for implementation. Interviews were conducted in person lasting approximately 30–50 minutes. All interviews were recorded and transcribed for analysis.

Surveys: An electronic survey was administered to the same participants who were interviewed, using QualtricsXM. The survey included questions designed to prioritize the core competencies and features required for the integration of the software tools. Participants were asked to rate the importance of various elements on a Likert scale and to provide additional qualitative feedback.

Qualitative Analysis: The interview transcripts were examined through thematic analysis, focusing on detecting recurring themes and patterns concerning the feasibility, advantages, and obstacles of implementing the software tools. This method provided a detailed understanding of the participants' insights and experiences.

Triangulation: Survey responses were analyzed to assess the prioritization of core competencies and features. This quantitative data, when triangulated with qualitative insights from interviews and literature review findings, provided a comprehensive picture of the participants' collective perspectives on the integration of the software tools. This method allowed for cross-verification of data, highlighting areas of agreement or divergence between quantitative responses and qualitative feedback, thus enhancing the overall reliability of the study's findings.

This chapter summarized the methodology employed in our project report to explore the integration of software technologies into the NPS Defense Contract Management curriculum. It provided a comprehensive overview of the research methods and approaches used to achieve our primary objectives. We began by detailing the research method chosen and the rationale behind its selection, ensuring alignment with the goals of our study. We then restated our research questions to clarify the focus of our investigation. Finally, we described the data collection methods used to gather relevant information and outlined the analytical techniques applied to interpret the findings effectively.

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IV. FINDINGS AND ANALYSIS

A. INTRODUCTION

This chapter presents the findings from our research, derived from interviews and surveys with NPS Department of Defense Management, contract management program faculty members. We will first discuss the findings, focusing on the faculty's perspectives regarding the feasibility and effectiveness of integrating contract management software tools into the curriculum. The analysis is structured around our two research questions, each examined through corresponding interview and survey questions. For each research question, we will explore the themes identified in the interview and survey responses, providing insights into the potential impacts and benefits of this integration. Following the discussion of findings, we will analyze the implications for contract management education. This chapter concludes with recommendations based on our findings.

B. FINDINGS

To examine our research questions, we designed an interview and survey targeted at six faculty members within the contract management program. The research was structured around our two research questions. Research question 1 included 3 interview questions and 8 survey questions, while Research question 2 included 3 interview questions and 13 survey questions. These questions were designed to elicit detailed responses about the feasibility and impact of integrating these software tools into contract management courses, such as MN3303 and MN3315.

Both the interviews and surveys were conducted in July 2024. The interviews were completed individually, providing detailed qualitative insights into the faculty's perspectives, while the surveys, distributed through QualtricsXM, ensured a broad capture of faculty opinions on the relevance of contract management software integration in the NPS curriculum.

Table 1 presents a comprehensive demographic profile of the six survey and interview participants. These participants hold diverse roles, including Associate Professors and Senior Lecturers to military officers with over 20 years of service. Their combined wealth of academic knowledge and practical expertise in acquisition and contract management ensures a deep understanding of both the theoretical and operational aspects of U.S. Navy contract management. These diverse participants bring a wide range of specializations, including acquisition, procurement, logistics, and supply chain management, which further enriches the study's analysis of integrating advanced software tools like Unison and Noblis into contract management courses such as MN3303 and MN3315. By leveraging their vast experience in both educational models and real-world contracting, the insights provided in this study are highly relevant, ensuring that the feedback gathered is grounded in both the academic and practical demands of U.S. Navy contracting operations.

Table 1. Survey and Interview Participants' Demographics

	Number	Percentage
Faculty Position		
Lecturer	2	33%
Senior Lecturer	2	33%
Associate Professor	1	17%
Assistant Professor	1	17%
Department of Defense Management Area		
Contract Management	6	100%
NPS Experience (Years)		
0–10	5	83%
10–20	1	17%
Education		
MBA	5	83%
DBA	1	17%
MA	1	17%
MS	1	17%
BS/BA	6	100%
PhD	1	17%
Research Interest		
Acquisition Management	5	83%
Contract/Procurement Management	4	67%
Logistics Management	2	33%
Supply Chain Management	1	17%
Teaching Interest		
Acquisition Management	5	83%
Contract/Procurement Management	5	83%
Logistics Management	2	33%

The table provides demographic information of six (6) faculty members at the NPS's Department of Defense Management, focusing on their roles and areas of expertise. The respondents represent a diverse range of specializations within acquisition and contract management, offering valuable insights into integrating advanced software tools into the curriculum.

Table 2 presents a summary of the Likert scale results derived from the interview questions, capturing the faculty's perceptions regarding the integration of advanced software tools into the curriculum. The scores were derived by analyzing the qualitative responses from the interviews and assigning numerical values based on the level of agreement or satisfaction expressed by each respondent. The scale ranges from 1 (Strongly Disagree), 2 (Disagree), 3 (Neutral), 4 (Agree), to 5 (Strongly Agree).

Table 2. Summary of Results Corresponding to the Interview Questions

Interview Question	Respondent 1	Respondent 2	Respondent 3	Respondent 4	Respondent 5	Respondent 6
1. Importance of Software Tools (Unison, Noblis) for Future Competencies	3	4	4	4	4	4
2. Experience in Academia with Software Integration	2	4	3	4	4	3
3. Enhancement of Learning Outcomes through Integration	3	4	4	4	4	4
4. Recommended Metrics for Evaluating Effectiveness	4	4	4	4	4	4
5. Syllabus Adaptability to Technological Advancements	4	4	4	4	4	4
6. Projected Cost Implications vs. Benefits	3	4	3	3	3	3

Table 3 offers a consolidated view of the survey responses. The results were derived by compiling and categorizing individual responses from the survey data into the corresponding Likert scale categories. Each survey question was analyzed, and the frequency of responses in each category (e.g., "Not Familiar," "Slightly Familiar," etc.) was counted and summarized to provide an overall view of the respondents' perspectives on each aspect of the curriculum and its modernization with technological tools.

Table 3. Frequency Analysis of Survey Response Questions

Survey Question					
Q1: Familiarity with MN3315 Curriculum	Not familiar at all: *0*	Slightly familiar: *2*	Moderately familiar: *0*	Very familiar: *2*	Extremely familiar: *2*
Q2: Familiarity with MN3303 Curriculum	Not familiar at all: *0*	Slightly familiar: *2*	Moderately familiar: *1*	Very familiar: *0*	Extremely familiar: *3*
Q5: Awareness of Technological Advancements (Unison)	Not aware at all: *1*	Not so aware: *0*	Somewhat aware: *5*	Very aware:*0*	Extremely aware: *0*
Q6: Awareness of Technological Advancements (Noblis)	Not aware at all: *1*	Not so aware: *0*	Somewhat aware: *5*	Very aware: *0*	Extremely aware: *0*
Q7: Importance of Integrating Technologies into MN3315	Not at all important:*1*	Slightly important: *0*	Moderately important: *4*	Very important: *1*	Extremely important: *0*
Q8: Importance of Integrating Technologies into MN3303	Not at all important: *1*	Slightly important: *1*	Moderately important: *2*	Very important: *2*	Extremely important: *0*
Q9: Value of Integrating Software Tools for MN3315	Not at all valuable: *0*	Not so valuable: *1*	Somewhat valuable: *3*	Very valuable: 0	Extremely valuable: *2*
Q21: Beneficial for Collaboration with Software Developers/Industry Experts	Not at all beneficial: *0*	Not so beneficial: *0*	Somewhat beneficial: *3*	Very beneficial: *1*	Extremely beneficial: *2*

Note: The numbers in the table show the frequency of responses for each category.

C. DISCUSSION OF FINDINGS

In this section, we will discuss the findings from our research, focusing on each research question. For each research question, we will present and analyze the key themes that emerged from both the interview and survey responses. This discussion will explore the faculty's insights on the integration of advanced software tools into the MN3303 and MN3315 courses, examining the common challenges, opportunities, and potential impacts on U.S. Navy contracting officer preparedness. Additionally, a comprehensive analysis of these findings will highlight how the integration of tools like Unison and Noblis can enhance the contract management process, standardize training, and bridge the gap between theoretical learning and practical application.

1. Research Question 1: Interview Themes

How can the integration of instructional software tools into the MN3303 (Principles of Acquisition and Contract Management) and MN3315 (Acquisition Management and Contract Administration) courses offered by the NPS Department of Defense Management enhance the preparedness of future U.S. Navy contracting officers in the fleet?

Table 4 presents the key themes that emerged from the interview responses related to Research Question 1. These interview themes were derived by analyzing research participants' responses and insights to identify common challenges, opportunities, and strategic recommendations for integrating modern contract management technologies into the MN3303 and MN3315 curricula.

Table 4. Research Question 1: Interview Response Themes

Associated Interview Questions (IQ)	Underlying Response Themes
IQ1. Considering the current technological landscape of defense procurement, what are the most critical skills and competencies that future military contracting officers need and how can integrating instructional software tools like Unison reverse auctioning and Noblis source selection help address those needs?	• Enhancing Defense Procurement Skills: Future military contracting officers need a deep understanding of the full procurement process, critical thinking, strategic thinking, and proficiency in contracting policies. Software tools like Unison and Noblis can facilitate practical application by simulating real-world scenarios and providing hands-on experience.
IQ3. In your opinion, how would the integration of software tools like Unison reverse auctioning and Noblis' source selection evaluation software into courses MN3303 and MN3315 enhance the learning outcomes for students? What specific skills or competencies do you think will be most improved by these tools?	• Bridging Theory and Practice: Enhances learning by providing hands-on experience with contracting processes. Application of key competencies such as solicitation development, source selection, market research, cost analysis, and price negotiation. By simulating real-world scenarios, these tools bridge the gap between theoretical concepts and practical application, fostering critical thinking and strategic analysis.
IQ4. What metrics or assessment strategies would you recommend for evaluating the effectiveness of integrating these software tools in improving student learning outcomes and readiness for their roles as military contracting officers?	• Various strategies applicable: Recommended metrics include formative assessments through software-driven exercises, summative assessments such as capstone projects or exams, post-class student surveys, and feedback loops from graduates.

The integration of instructional software tools such as the Unison reverse auctioning, and Noblis source selection evaluation software significantly enhances the defense procurement skills of future U.S. Navy contracting officers. These tools provide critical hands-on experience, facilitating a deep understanding of the procurement process, including contracting policies, critical thinking, and strategic analysis. This practical application is essential for preparing officers to handle real-world procurement scenarios effectively.

Two Respondents (#1 and #5) highlighted the importance of understanding the contracting life cycle, from the pre-award phase through the award and post-award (interview with author, 18–25 July 2024). The use of Noblis in the classroom enables

officers to engage directly with source selection processes, enhancing competencies in market research, solicitation development, and proposal analysis. This hands-on experience aligns with the literature review, which emphasizes the role of technology-based teaching in creating active and effective learning environments (Ghavifekr & Rosdy, 2015).

Respondent #2 noted that integrating software tools like Unison and Noblis could build a foundation for critical thinking and strategic analysis—skills necessary for effective defense procurement (interview with author, 18–25 July, 2024). These tools allow students to engage with scenarios that mirror real-world challenges, improving their ability to apply theoretical concepts in practical settings.

Moreover, one Respondent (#3) emphasized that these tools are particularly useful for understanding pre-award and award phases, critical components of the contracting life cycle (interview with author, 18–25 July, 2024). Noblis' source selection software, for instance, helps students develop key competencies in cost analysis and price negotiation by providing simulations that reflect real-world scenarios.

The integration of these software tools into courses such as MN3303 and MN3315 bridges the gap between theoretical concepts and practical application. By simulating real-world scenarios, these tools enhance learning outcomes, fostering critical thinking and strategic analysis. This is supported by Kolb's Experiential Learning Theory, which posits that learning is most effective when students can actively engage with and apply theoretical concepts in practical settings. The practical experiences provided by these software tools confirm that integrating technology into the curriculum not only aligns with theoretical insights from the literature but also meets the educational needs identified through interviews with NPS instructors.

The alignment of these tools with the Navy's educational and mission objectives is evident. Two Respondents (#2 and #6) pointed out that the tools, when used in an academic setting, can help standardize training across different services, ensuring consistency in how contracting officers are prepared for their roles (interview with author, 18–25 July, 2024). This standardization is crucial given the varied approaches to contracting across the Navy,

Air Force, and Army. Half of the Respondents (#2, #3, and #6) stressed that these tools allow for a closer alignment between classroom activities and mission-area processes, ensuring that the educational experience is relevant and directly applicable to real-world scenarios (interview with author, 18–25 July, 2024).

Various metrics are recommended to evaluate the effectiveness of integrating these software tools. Four out of six Respondents (#1, #2, #3, and #6) suggested using formative assessments through software-driven exercises during courses, summative assessments such as capstone projects or exams, and post-class student surveys (interview with author, 18–25 July, 2024). These metrics provide a comprehensive understanding of the tools' impact on student learning outcomes and readiness for their roles as military contracting officers.

Furthermore, feedback loops from NPS graduates can offer valuable insights into how well these tools prepare students for the field. Most respondents recommended capturing feedback a year, three years, or even five years after graduation to assess the long-term impact of these tools on professional effectiveness.

2. Research Question 1: Survey Response Themes

Table 5 presents the key themes that emerged from survey responses related to Research Question 1. These survey response themes were identified by examining common patterns and challenges in the survey responses related to curriculum, technology use, and faculty support.

Table 5. Research Question 1: Survey Response Themes

Associated Survey Questions (SQ)	Underlying Response Themes
SQ7. How important do you believe it is to integrate contract management technologies into the MN3315 curriculum?	• **Varied Perception on Importance**: Overall, responses range from seeing little to significant value in integrating modern contract management technologies
Q8. How important do you believe it is to integrate modern contract management technologies into the MN3303 curriculum?	
SQ9. How valuable do you think the integration of instructional software tools into the curriculum would be for preparing U.S. Navy contracting officers graduating from NPS to enter their mission areas?	• **Mixed Perceived Value:** Overall, the perceived value of integrating instructional software tools varies, with opinions ranging from low to extremely high.
SQ10. What do you see as the biggest barriers or challenges to integrating such technologies into the contract management curriculum at the NPS?	• **-Resource and Access constraints:** Key barriers include time, resources, budget constraints, access to technologies, and the complexity of aligning diverse tools and techniques across different organizations.
SQ12. We are researching the feasibility of integrating Unison reverse auctioning into the MN3303 curriculum. How do you think the integration of this software tool would affect students' engagement and learning outcomes in the MN3303 course?	• **Conditional Benefits and Concerns**: Integration of tools like Unison and Noblis could have conditional benefits. While it may enhance student engagement and understanding of course concepts, its effectiveness depends on the alignment with course goals, the ease of learning the tool, and its relevance to real-world applications. Concerns include the tool's limited scope and potential added costs. Overall, the impact on learning outcomes hinges on these contextual factors
SQ13. We are researching the feasibility of integrating Noblis source selection software into the MN3315 curriculum. How do you think the integration of this software tool would affect students' engagement and learning outcomes in the MN3315 course?	
SQ20. Looking ahead, what skills and competencies do you believe will be most critical for future military contracting officers, and how can the curriculum address these?	• **Evolving Skills and Strategic Competencies**: Critical skills and competencies identified includes; the need for regulatory alignment, technological proficiency, strategic and critical thinking, and data literacy. The curriculum should address these areas by incorporating hands-on assignments, researching emerging tools, and teaching the use of relevant software technologies.
SQ21. How beneficial do you think collaboration with software tool developers or industry experts would be in integrating these technologies into the contract management curriculum?	• **Recognized value of Collaboration:** Overall, there is a consensus that collaboration with industry experts and developers would be beneficial, with opinions ranging from moderate to extremely high value.

These survey response themes were identified by examining common patterns and challenges in the survey responses related to curriculum, technology use, and faculty support.

The survey responses reveal varied perspectives on the integration of modern contract management technologies into the curriculum, ranging from low to extremely high perceived

value. This range of opinions illustrates the different levels of acceptance and perceived utility of these technologies among respondents. The mixed perceptions align with Rogers' Diffusion of Innovation Theory, which highlights the importance of creating awareness and persuading stakeholders during the early stages of adopting new technologies (Rogers, 2003). Several respondents emphasized the need to demonstrate clear advantages to overcome initial resistance. For example, Respondent #1 expressed that the integration of these tools is "not so valuable," highlighting a more cautious approach to technology adoption, while the five other Respondents stated that it would be "moderately important" to "very important," indicating strong support for the integration of modern tools to enhance learning outcomes.

The survey also uncovered significant barriers to the integration of these technologies, primarily revolving around resource constraints, access to technology, and varied organizational methods. For instance, half of the six Respondents (#3, #5, and #6) pointed out that cost and/or access to technology were major obstacles, while two out of 6 Respondents (#2 and #6) elaborated that the cost of the technology and the time required to teach it detracts from core instructional content. This theme of resource and access constraints resonates with Ely's (1999) findings that emphasize the high costs and need for resource allocation as significant challenges in technology integration.

Regarding the potential benefits of integrating contracting software tools, the responses suggest that while these tools could enhance student engagement, their effectiveness depends on factors such as ease of use and alignment with course content. One Respondent (#3) noted that "it could be beneficial if the learning curve for using the software is low, emphasizing the importance of user-friendly interfaces for successful integration. Meanwhile, five out of six Respondents (#2, #3, #4, #5, and #6) believed that the software would help students better understand course concepts, demonstrating the perceived educational value when these tools are properly aligned with the curriculum. This aligns with Rogers' DOI theory, which stresses the importance of compatibility and ease of use in the successful adoption of new technologies.

The need for collaboration with software developers and industry experts was also highlighted as a key factor in ensuring the successful integration of these tools. One Respondent (#2) described collaboration as extremely valuable, underscoring the significant

benefits of involving industry professionals in the curriculum development process. This reflects the Government-Industry-Academia (G-I-A) co-education model, which promotes early collaboration to enhance trust and innovation (Poree, 2024).

3. Research Question 2: Interview Response Themes

What are the essential elements of a revised course for the MN3303 (Principles of Acquisition and Contract Management) and MN3315 (Acquisition Management and Contract Administration) that would effectively integrate the Contract Management Software Tools that seamlessly connect theoretical knowledge with practical application?

Table 6 presents the key themes that emerged from the interview responses related to Research Question 2. These themes were derived by analyzing participants' insights on common challenges, opportunities, and strategic recommendations for integrating contract management technologies into the MN3303 and MN3315 curricula.

Table 6. Research Question 2: Interview Response Themes

Associated Interview Questions (IQ)	Underlying Response Themes
IQ2. Can you describe your previous experiences in academia, if any, with integrating software tools into the curriculum? What were the primary challenges and successes encountered during these integrations? IQ5. How can we ensure that the revised syllabus remains adaptable and responsive to future technological advancements in the field of defense contracting, and what best practices or lessons learned from other educational institutions or training programs could inform our approach to integrating these software tools? IQ6. What are the projected cost implications and potential financial benefits of integrating software tools into contracting courses? How does this balance with the expected enhancements in syllabus effectiveness and long-term operational outcomes for graduates?	• **Balancing Challenges and successes in integration:** Previous integrations faced challenges like steep learning curves, limited time to effectively use the software, and the need for additional class preparation. Successes were observed when the software supported core learning objectives and provided enduring skills. • **Continuous Review:** Ensuring curriculum adaptability involves regular reviews, continuous market scanning for updated content, and close connections with the mission area to align with current practices. Best practices include insights from institutions like DAU. • **Investing in Long-term Benefits**: Initial costs include licensing fees and faculty training, but many software companies offer educational discounts or free access. Long-term benefits include reduced on-the-job training costs and enhanced operational readiness of graduates.

Integrating software tools into academic curricula presents several challenges, as implied by the interviewees. One of the primary issues highlighted is the steep learning curve associated with new tools, which can be overwhelming for both students and faculty. Respondent #2 suggested that academia often struggles to integrate software effectively due to the broad focus on general concepts rather than practical interaction with the tools. Additionally, there is often limited time within a course to fully explore and utilize these tools, as noted by several interviewees. This time constraint necessitates careful planning and preparation, placing a significant burden on instructors to adapt quickly. Despite these hurdles, successes have been observed, particularly when the software aligns well with core learning objectives. Two out of six Respondents (#3 and #5), indicated that when students learn skills that are directly applicable in the field, the integration of software becomes much more effective, providing enduring value beyond the classroom.

Ensuring that the revised curriculum remains adaptable and responsive to future technological advancements is crucial, as suggested by the interview responses from respondent #1, #2, #3, #5 and #6. These interviewees emphasized that adaptability requires regular curriculum reviews and continuous market scanning to incorporate the latest technological trends. There was a consensus that institutional support for ongoing updates is essential to keep the curriculum current and aligned with industry practices. Additionally, maintaining close connections with mission areas was highlighted as vital, ensuring that educational content stays relevant to real-world needs. Respondents #2 and #6, also pointed out that learning from established institutions like the Defense Acquisition University (DAU) provides valuable insights, suggesting that best practices from these organizations can guide curriculum revisions and help maintain alignment with industry standards.

The cost implications and potential financial benefits of integrating software tools were frequently discussed by all the interviewees, who implied that these are significant considerations for educational institutions. Initial costs, such as licensing fees and faculty training, can be substantial, but respondents #2 and #6 suggested that many software companies offer discounts or even free access to their tools for educational purposes. These discounts are crucial for making such integrations feasible, especially for institutions with

limited budgets. The long-term benefits, however, were described as compelling. Interviewees, particularly respondents #1 and #5, indicated that graduates who are proficient in using these tools require less on-the-job training, leading to cost savings for their future employers. This balance between initial investment and long-term gains was frequently cited as evidence of the financial viability and strategic advantage of incorporating these tools into the curriculum.

The analysis of the interviews revealed that the essential elements for revising the MN3303 and MN3315 courses involve addressing integration challenges, ensuring curriculum adaptability, and weighing cost implications against long-term benefits. These interviewees implied that these insights align well with the theoretical frameworks discussed in Chapter II, specifically the Diffusion of Innovation (DOI) Theory and Kolb's Experiential Learning Theory. They suggested that by focusing on skills that students will directly apply in the field, the curriculum can stay relevant and effective. This approach ensures that the curriculum not only stays up to date but also equips students with practical skills that are directly applicable in their future careers, thus enhancing the overall effectiveness of the NPS contract management educational program.

4. Research Question 2: Survey Response Themes

Table 7 presents the key themes that emerged from survey responses related to Research Question 2. These themes were identified by examining common patterns and challenges in the survey responses related to curriculum, technology use, and faculty support.

Table 7. Research Question 2: Survey Response Themes

Associated Survey Questions (SQ)	Underlying Response Themes
SQ1. How familiar are you with the current MN3315: Acquisition Management and Contract Administration course curriculum and its objectives? SQ2. How familiar are you with the current MN3303: Principles of Acquisition and Contract Management course curriculum and its objectives? SQ3. In your opinion, what are the main challenges in the current MN3315 course curriculum regarding the preparation of military students for the defense contracting mission area? SQ4.In your opinion, what are the main challenges in the current MN3303 course curriculum regarding the preparation of military students for the defense contracting mission area? SQ5.How aware are you of the latest technological advancements in the defense contracting environment such as Unison reverse auctioning software? SQ6.How aware are you of the latest technological advancements in the defense contracting environment such as Noblis source selection software? SQ11.What kind of training or support do you believe defense contracting faculty members at NPS would need to effectively integrate these software tools into their teaching? SQ14.Can you suggest any specific software tools or technologies that you believe would be most beneficial to include in the MN3315 curriculum? SQ15.Can you suggest any specific software tools or technologies that you believe would be most beneficial to include in the MN3303 curriculum? SQ16.What suggestions do you have for revising the MN3315 curriculum to include these software tools effectively? SQ17.What suggestions do you have for revising the MN3303 curriculum to include these software tools effectively? SQ18.How valuable do you think it would be to incorporate case studies or real-world applications of these software tools into the curriculum? SQ19.What mechanisms would you suggest for collecting feedback from faculty on the effectiveness of the integrated software tools in the curriculum?	Awareness and Familiarity with Current Curriculum and Technological Advancements: Respondents exhibit varied levels of familiarity with the MN3315 and MN3303 course curricula and the objectives they aim to achieve. Similarly, awareness of technological advancements in defense contracting, such as Unison and Noblis software, varies significantly, indicating a need for enhanced exposure and training. Challenges in Curriculum Content and Delivery: A key challenge is effectively applying real-world case studies to course concepts, complicated by the diverse backgrounds of students. Additionally, there is a need to align course content more closely with future assignments and mission area requirements to ensure practical applicability. Barriers to Integrating Modern Technologies: Significant barriers to integrating new technologies into the curriculum include gaining access, the cost of implementation, and constraints on time and resources. Balancing the teaching of core fundamentals with the introduction of new software tools and keeping up with software updates are also major concerns. 4.Training and Support for Faculty: Faculty members need free access to new technologies and comprehensive training on their use, along with support mechanisms for addressing technical issues. In-class exercises using these tools are recommended to facilitate practical, hands-on learning. Value and Feasibility of Integrating Software Tools: Integrating modern procurement technologies into the curriculum is generally seen as beneficial for student engagement and learning outcomes, provided the learning curve is manageable. Incorporating case studies and real-world applications of these tools is valuable if they align with clear learning objectives and reinforce core concepts.

The survey responses indicate varied levels of familiarity with the current curricula of MN3303 and MN3315 and technological advancements such as Unison and Noblis software. Some respondents, including #1 and #6, highlighted the need for enhanced exposure and training, noting challenges in applying real-world case studies to the course concepts and learning objectives. This suggests a significant gap that the revised curriculum could address by incorporating these technologies to better prepare students for real-world applications.

Respondents identified several challenges in the current curriculum. These challenges, mentioned by respondents #3 and #5, include the effective application of real-world case studies to course concepts, the diverse backgrounds of students complicating a universal approach, and the need for aligning course content with future assignments and mission area requirements. Respondent #5 suggested that integrating software tools could help bridge these gaps by providing practical, hands-on experience that relates to real-world scenarios, thereby enhancing the practical applicability of the theoretical knowledge imparted.

Key barriers to integrating modern technologies include access to technology, cost of implementation, time constraints, and the challenge of balancing core fundamentals with the introduction of new tools. Respondents #1 and #2 recognized the potential benefits of such integration, including improved student engagement and learning outcomes. These insights highlight the need for a structured approach to technology integration, ensuring it complements and enhances the existing curriculum rather than overwhelming it.

Effective integration of modern technologies requires comprehensive training and support for faculty. Survey responses, particularly from respondents #3, and #6 show a need for free access to these technologies, training on their use, and mechanisms for addressing technical issues. This underscores the importance of equipping faculty with the necessary skills and resources to facilitate a smooth integration of software tools into their teaching.

There is a consensus on the value of integrating contract management technologies into the curriculum, provided the learning curve is manageable. Incorporating case studies

and real-world applications of these tools is seen as beneficial by respondents #2, and #5, especially if they align with clear learning objectives and reinforce core concepts. This aligns with the overall goal of seamlessly connecting theoretical knowledge with practical application, thereby enhancing the educational experience and operational readiness of future Navy contracting officers.

The findings from the survey responses align with the themes discussed in the literature review, particularly regarding the integration of technology in education and the importance of experiential learning. The literature review highlights the relevance of Diffusion of Innovation Theory and Kolb's Experiential Learning Theory in understanding the adoption and implementation of modern technologies in educational settings. The survey responses, as suggested by respondents #1 and #6, reinforce the need for creating awareness, persuading stakeholders, and implementing practical steps for successful technology integration, aligning well with Rogers' stages of adoption and Kolb's experiential learning cycle.

The analysis of the NPS contract management graduate education and its alignment with the NCMA CMBOK competencies underscores the need for a curriculum that not only covers theoretical aspects but also provides practical, hands-on experience. Respondents #2 and #3 implied that the integration of software tools into MN3303 and MN3315 can address this need by offering students direct engagement with technologies used in the field, thereby enhancing their readiness for real-world challenges.

The literature review discusses the potential challenges and benefits of incorporating advanced software tools into the curriculum. The survey responses corroborate these points, highlighting both the barriers (such as cost and access) and the perceived benefits (improved engagement and learning outcomes). This alignment, as pointed out by respondents #2 and #6, suggests that a carefully planned integration strategy, supported by adequate training and resources, can effectively enhance the curriculum.

D. IMPLICATION OF FINDINGS

This comprehensive analysis, based on interviews and surveys from 6 faculty members within the NPS DDM, reveals that the integration of instructional software tools

into the MN3303 and MN3315 courses at NPS is poised to significantly enhance the preparedness of future U.S. Navy contracting officers. As identified in the interview and survey responses, critical skills for future military contracting officers include a comprehensive understanding of the contracting life cycle, from pre-award to post-award phases, as well as strategic and critical thinking and proficiency in contracting policies. Instructional tools like Unison reverse auctioning and Noblis source selection offer practical, hands-on experiences that mirror real-world contracting scenarios, bridging the gap between theoretical knowledge and practical application. This integration is essential for equipping students with the necessary skills to handle complex procurement tasks effectively.

These tools can standardize training and mitigate variations in contract life cycle across different military services by providing students with a consistent approach to contract management that can be applied across various branches. For instance, Unison is extensively used across major Navy organizations such as NAVAIR, NAVSUP, and NAVSEA, where it plays a vital role in managing research and development contracts. Over the past three years, Unison has processed 6,389 actions amounting to a total value of $357,753,422.00, underscoring its significance in the Navy's contracting processes (Unison, PowerPoint slides, April 24, 2023). Similarly, Noblis has been an invaluable partner to the Department of Defense, managing procurement and acquisition processes with a cumulative support value exceeding $460 billion, thus reinforcing its critical role in standardizing procurement practices across the federal government, including the Navy (Noblis, PowerPoint slides, May 21, 2023).

According to the FAR, the guiding principle states "the Federal Acquisition System will minimize administrative operating costs" (FAR 1.102(d), 2024). Standardizing training with tools like Unison and Noblis can help achieve this by reducing the variability and complexity in training processes across different services, ultimately leading to cost-effective contract management practices. Furthermore, these tools enhance strategic and critical thinking skills by involving students in exercises that require market analysis, proposal evaluation, and informed decision-making, fostering a deeper understanding of procurement's strategic elements such as cost analysis, price negotiation, and market

research. By simulating these real-world scenarios, students can develop the necessary competencies to excel in their future roles. FAR 15.101-1(c) (2024) emphasizes the importance of best value tradeoff analysis, which is a critical skill these tools help to develop: "When using a tradeoff process, the perceived benefits of the higher priced proposal shall merit the additional cost."

In terms of learning outcomes, the practical application of these tools allows students to apply theoretical concepts to real-world scenarios, reinforcing their understanding and preparing them for the challenges they will face as contracting officers. For example, using Noblis' source selection software enables students to simulate the entire source selection process, providing a holistic view of the contracting life cycle. The effectiveness of these integrations can be evaluated through formative and summative assessments, immediate feedback from students, and long-term professional impact assessments, focusing on metrics such as alignment with mission area processes, practical application of theoretical concepts, and the readiness of students for their roles. This comprehensive approach ensures that students are not only well-versed in contract management fundamentals but also adept at adapting to specific organizational procedures, ultimately enhancing the Navy's mission readiness.

Education and training are essential for achieving procurement efficiency: By integrating these instructional tools, we ensure that contracting officers receive the comprehensive training necessary to effectively address procurement challenges.

E. RECOMMENDATIONS BASED ON FINDINGS

Based on the findings, discussions, and implications of our research, we present the following recommendations to the Naval Postgraduate School. These recommendations are designed to support the integration of advanced software tools into the defense contract management curriculum, with the goal of enhancing the education and training of future U.S. Navy contracting officers. By implementing these recommendations, NPS can better align its programs with the practical demands of defense contract management, ensuring that students are well-prepared for their future roles:

- Curriculum Enhancement: The MN3303 (Principles of Acquisition and Contract Management) and MN3315 (Acquisition Management and Contract Administration) courses should be revised to include more hands-on activities and simulations using advanced software tools. This revision is crucial for bridging the gap between theoretical knowledge and practical application, ensuring that students gain real-world procurement and contract management experience. Several respondents emphasized that the integration of tools like Unison and Noblis is essential for developing the critical skills needed by future contracting officers, as these tools provide practical, scenario-based learning that directly aligns with the demands of their future roles.
- Resource Allocation: To successfully implement this integration, it is imperative to allocate adequate resources, including time, budget, and access to the necessary technologies. Ensuring that faculty are well-trained and comfortable with these tools is a key factor in overcoming the barriers identified by respondents. The need for sufficient resources is evident from the feedback, which highlighted that without proper support, the integration of these tools could be hindered, thus impacting the quality of education and training provided.
- Continuous Evaluation: Continuous evaluation of the effectiveness of these tools through formative and summative assessments, student surveys, and feedback loops is necessary to monitor and enhance their impact on the curriculum. The respondents advocated for these evaluation methods, noting that they provide valuable insights into how well the tools are integrated and their effect on student learning outcomes. Regular assessments will allow for timely adjustments to the curriculum, ensuring that it remains effective and aligned with the educational goals of NPS.
- Customized Learning Experiences: Finally, the development of customized learning experiences through modular training components

tailored to the diverse backgrounds of students is crucial. This approach recognizes that contracting officers from different military branches have varying levels of experience and familiarity with procurement technologies. Respondents underscored the importance of flexibility in the curriculum to accommodate these differences. By offering adaptable learning modules, the curriculum can better address the unique needs of all students, thereby enhancing the overall effectiveness of the training program.

F. SUMMARY

This chapter presented the findings from our research, discussed our findings, and the broader implications of these findings for contract management graduate education. In addition, we provided recommendations based on the research findings.

The next chapter will provide a summary of the overall research, a conclusion, identify potential areas for future research, and provide a final thought on the research.

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V. SUMMARY, CONCLUSION, AREAS OF FURTHER RESEARCH

A. INTRODUCTION

This chapter provides a summary of our research, synthesizing key findings from the preceding chapters. We offer conclusions to our research questions, which evaluate the feasibility and impact of integrating contract management software tools, specifically Unison and Noblis, into the MN3303 and MN3315 courses. Additionally, we provide recommendations for further research and enhancements to the NPS defense contract management curriculum, ensuring it remains aligned with evolving contract management practices and technologies.

B. SUMMARY

Educational institutions, particularly those in the military, play a pivotal role in preparing students for the complexities of modern, technology-driven environments. The need for technological literacy is especially critical in preparing U.S. Navy contracting officers, who must be equipped with the skills to navigate increasingly complex contract management processes. Current educational models often fall short in fully preparing these officers for real-world challenges, particularly as defense systems evolve and technological advancements outpace traditional teaching methods.

The integration of advanced software tools, such as Unison and Noblis, into the NPS defense contracting curriculum has been identified as a key solution to address these gaps. These tools provide hands-on, experiential learning opportunities that bridge the gap between theoretical knowledge and practical application. By incorporating these technologies into courses such as MN3303 and MN3315, NPS can ensure that future U.S. Navy contracting officers are better prepared to manage the complexities of military procurement and contract management.

This research seeks to develop a strategic approach for incorporating these technologies into the NPS curriculum, enhancing the readiness and effectiveness of U.S. Navy contracting officers. The findings align with broader educational trends that

emphasize the importance of aligning academic programs with real-world practices to foster deeper learning and greater operational efficiency.

C. CONCLUSION

The survey and interview responses yielded insightful answers to our two research questions:

- How can the integration of instructional software tools into the MN3303 (Principles of Acquisition and Contract Management) and MN3315 (Acquisition Management and Contract Administration) courses offered by the NPS' Department of Defense Management enhance the preparedness of future U.S. Navy contracting officers in the fleet?

The integration of instructional software tools like Unison reverse auctioning and Noblis source selection into the MN3303 (Principles of Acquisition and Contract Management) and MN3315 (Acquisition Management and Contract Administration) courses is seen as a strategic enhancement to the curriculum. Respondents noted that these tools offer critical hands-on experience, which is essential for developing competencies such as a deep understanding of the procurement process, critical and strategic thinking, and proficiency in contracting policies.

Among the six respondents, the majority (four) emphasized the significant benefits of these tools in bridging the gap between theoretical concepts and practical applications, which enhances learning outcomes. For instance, Respondents #1 and #5 highlighted the importance of these tools in understanding the entire contract life cycle from pre-award to post-award. However, two respondents (#1 and #2) expressed concerns about the challenges, such as the steep learning curve and the time required to integrate these tools effectively into the curriculum. This contrast between the majority who support the integration and the minority who are cautious underscores the need for careful planning and support mechanisms to maximize the benefits.

- What are the essential elements of a revised curriculum for the MN3303 and MN3315 courses that would effectively integrate these tools, seamlessly connecting theoretical knowledge with practical application?

Revising the MN3303 and MN3315 courses to effectively integrate these software tools requires focusing on current technological advancements, aligning learning paths with future assignments, and managing cost and access barriers. All six respondents emphasized the need for curriculum adaptability, advocating for regular reviews and continuous market scanning to incorporate the latest technological trends. They also stressed the importance of ensuring that the curriculum remains relevant to real-world needs by aligning course content with practical applications and mission area requirements.

Regarding the challenges, two respondents (#3 and #5) highlighted the financial implications of integrating these tools and stressed the need to manage costs effectively, possibly through educational discounts or phased implementation. Additionally, there were concerns about the steep learning curves associated with new tools and the limited time available within the course to fully explore and utilize these technologies. Despite these challenges, the long-term benefits of integrating these tools, such as reduced on-the-job training costs and enhanced operational readiness of graduates, were frequently cited as compelling reasons for their inclusion in the curriculum.

In conclusion, the integration of advanced software tools like Unison and Noblis into the MN3303 and MN3315 courses at NPS is poised to significantly enhance the preparedness of future U.S. Navy contracting officers. These tools provide practical applications that align with the competencies outlined in the NCMA CMBOK and are supported by Kolb's Experiential Learning Theory. While there are challenges, such as resource constraints and the need for faculty training, the strategic implementation of these tools will improve the educational experience and ensure that future U.S. Navy contracting officers are well-prepared for the complexities of defense procurement. This approach not only meets the evolving needs of the Navy but also enhances operational readiness, contributing to the overall effectiveness of defense contracting in real-world scenarios.

D. AREAS OF FURTHER RESEARCH

This study faces several limitations that may affect the generalizability and applicability of its findings. Firstly, the sample size is restricted to a limited number of faculty members within NPS. This small and specific group may not fully represent the broader perspectives of all potential stakeholders involved in the integration of contract management software tools. Consequently, the findings might not capture the diverse views and experiences of other faculty members or professionals in different institutions or contexts.

Secondly, the scope of the study is confined to the integration of two specific software tools, Unison reverse auctioning and Noblis' source selection evaluation software, into two particular courses, MN3303 and MN3315. This narrow focus might overlook other relevant software tools and courses that could also benefit from similar integrations, thus limiting the comprehensiveness of the study's conclusions.

Methodologically, the reliance on qualitative data from semi-structured interviews and surveys may introduce subjective biases. Participants' responses might be influenced by their personal experiences, predispositions, and familiarity with the software tools, which can affect the objectivity of the results. Additionally, the study's qualitative approach, while providing in-depth insights, might not allow for broad generalizations across different educational environments or technological integrations.

These limitations suggest that while the findings offer valuable insights into the feasibility and potential benefits of integrating specific software tools into the NPS curriculum, caution should be exercised in extending these conclusions to other settings.

While the research findings yielded that successful integration of software tools will enhance the preparedness of future contracting officers, the current research did not have sufficient time to address all remaining gaps and optimize the educational experience fully. Future studies should aim to provide deeper insights and explore new opportunities for continuous improvement in contract management education. By addressing these gaps, future research can further enhance the practical application and effectiveness of these technologies in the curriculum.

- Faculty and Student Perceptions: While the current study gathered insights from faculty members, it did not extensively explore student perceptions and experiences with the integrated software tools. Future research could include comprehensive surveys and interviews with students to understand their perspectives and learning outcomes.
- Collaborative Course Material Development: Future students could work with Unison and Noblis to generate demo course materials for MN3303 and MN3315. These materials could be used in class for trial, providing practical exposure to the software tools and allowing for iterative improvements based on feedback from both students and faculty.
- Employing Mixed-Method Approaches Summary: To ensure a comprehensive analysis, future research should combine qualitative and quantitative methods, using surveys and statistical analyses to measure the effects of software tool integration on learning outcomes.
- Feedback from the Mission Area: Future research should seek to gather and analyze feedback from contracting officers and other stakeholders in the mission area who are directly impacted by the implementation of these software tools. Understanding the real-world effectiveness and challenges faced in operational settings will provide invaluable insights for refining the integration process and ensuring that the curriculum is aligned with the practical demands of the field.
- Expanding Research to Other Educational Institutions: Future research could broaden the survey and interview population to include faculty from other universities offering education programs in contract management. Engaging professors from these programs could provide diverse perspectives on integrating software tools like Unison and Noblis into their introductory contract management courses, offering broader insights and best practices applicable beyond the Naval Postgraduate School.

E. FINAL THOUGHTS

The findings presented in this research project highlights the significant potential of integrating advanced contract management software tools, such as Unison and Noblis, into the NPS contract management curriculum. This integration promises to bridge the gap between theoretical knowledge and practical application, ensuring that future U.S. Navy contracting officers are well-prepared to navigate the complexities of modern defense procurement. The findings emphasize the importance of technological literacy and hands-on experience in enhancing the educational outcomes of military officers. By aligning the curriculum with the latest industry practices and tools, NPS can not only improve the readiness and effectiveness of its graduates but also contribute to the broader field of contract management education. This forward-thinking approach underscores the critical role of educational institutions in fostering innovation and preparing professionals to meet the evolving demands of national security and defense acquisition.

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